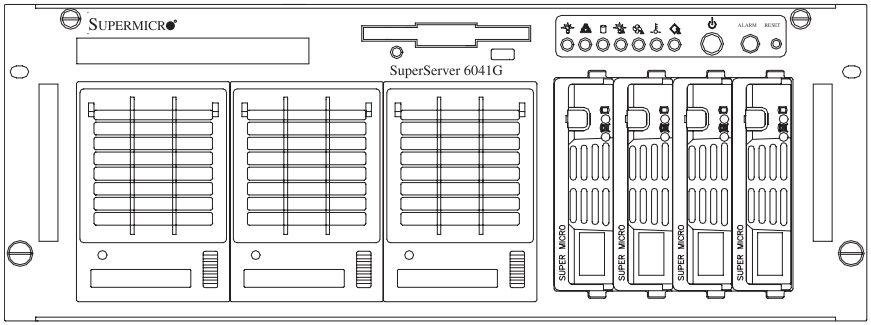
SUPERMICRO®

SUPERSERVER 6041G



USER'S MANUAL

1.0a

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Preface

About This Manual

This manual is written for professional system integrators and PC technicians. It provides information for the installation and use of the SuperServer 6041G. Installation and maintainance should be performed by experienced technicians only.

The SuperServer 6041G is a high-end dual processor 4U rackmount server based on the SC840 4U rackmount server chassis and the Super P3TDE6, a dual processor motherboard that supports one or two Pentium III FCPGA processors and 4GB registered ECC DIMM memory.

Manual Organization

Chapter 1: Introduction

The first chapter provides a checklist of the main components included with the server system and describes the main features of the P3TDE6 mainboard and the SC840 chassis, which make up the SuperServer 6041G.

Chapter 2: Server Installation

This chapter describes the steps necessary to install the SuperServer 6041G into a rack and check out the server configuration prior to powering up the system. If your server was ordered without processor and memory components, this chapter will refer you to the appropriate sections of the manual for their installation.

Chapter 3: System Interface

Refer here for details on the system interface, which includes the functions and information provided by the control panel on the chassis as well as other LEDs located throughout the system.

Chapter 4: System Safety

You should thoroughly familiarize yourself with this chapter for a general overview of safety precautions that should be followed when installing and servicing the SuperServer 6041G.

Chapter 5: Advanced Motherboard Setup

Chapter 5 provides detailed information on the motherboard, including the locations and functions of connections, headers, jumpers and IRQs. Refer to this chapter when adding or removing processors or main memory and when reconfiguring the motherboard.

Chapter 6: Advanced Chassis Setup

Refer to Chapter 6 for detailed information on the 4U rackmount server chassis. You should follow the procedures given in this chapter when installing, removing or reconfiguring SCSI or peripheral drives and when replacing system power supply units and cooling fans.

Chapter 7: BIOS

The BIOS chapter includes an introduction to BIOS and provides detailed information on running the CMOS Setup Utility.

Appendix A: BIOS Error Beep Codes and Messages

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Chapter 1
Introduction to the SuperServer 6041G

1-1 Overview

The Supermicro SuperServer 6041G is a high-end dual processor, 4U rackmount server that features some of the most advanced technology currently available. The SuperServer 6041G is comprised of two main subsystems: the SC840 4U rackmount chassis and the P3TDE6 dual 370-pin Pentium III processor mainboard. Please refer to our web site for information on operating systems that have been certified for use with the SuperServer 6041G.

In addition to the mainboard and chassis, various hardware components may have been included with your SuperServer 6041G, as listed below.

- One (1) 1.44" floppy drive
- One (1) slim CD-ROM drive
- One (1) Supermicro CD containing various drivers and utilities
- One (1) Control Panel PCB
- Rackmount hardware (with screws):
  Two (2) rack rail assemblies
  Four (4) brackets for mounting the rack rails to the rack
- One (1) SCA backpanel
- Four (4) SCA SCSI drive carriers
- SCSI Accessories:
  One (1) internal and one (1) external Ultra160 SCSI cable
  One (1) set of SCSI driver diskettes
  One (1) SCSI manual
  One (1) System manual

You should also have received this User's Manual and several Supermicro diskettes, which contains various drivers and utilities.

1-2 Server Chassis Features

The SuperServer 6041G is a high-end, scaleable 4U rackmount server platform designed with today's most state-of-the-art features. The following is a general outline of the main features of the SC860 chassis.

System Power

A dual redundant power supply system consisting of two 300W units to provide 300W of continuous power with 300W of backup. (This dual redundant power supply system can be upgraded to a triple redundant system.) If any one of the two power units fail you will be notified by alarm and LED, and the backup unit will automatically activate. These are hot-plug units that can be replaced without powering down the system.

SCSI Subsystem

The SCSI subsystem supports 4 68-pin SCA Ultra160 SCSI hard drives. (Any standard 1" drives are supported. SCA = Single Connection Attachment.) The SCSI drives are connected to a SAF-TE compliant SCA backplane that provides power, bus termination and configuration settings. The SCSI drives are also hot-swap units. A RAID controller card can be used with the SCA backplanes to provide data security.

Note: The operating system you use must have RAID support to enable the hot-swap capability of the SCSI drives.

Control Panel

The SuperServer 6041G's detailed control panel provides comprehensive system monitoring and control. LEDs indicate network activity, power supply failure, fan failure, fan status, SCSI drive activity and failure and SCA backplane overheat conditions. The control panel also includes a main power button, a system reset button and an alarm reset switch.

I/O Shield

The SC840 is a 4U rackmount chassis. Its I/O shield provides seven motherboard expansion slots, two COM ports, a parallel port, two USB ports, PS/2 mouse and keyboard ports, and an Ethernet port. (See Figure 1-1.)

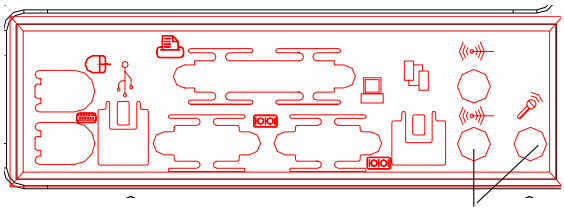


Figure 1-1. I/O Shield

Cooling System

The SC840 chassis has an innovative cooling design that includes four 9-cm hot-plug system cooling (intake) fans and one 9-cm hot-plug exhaust fan. All system fans operate continuously to provide optimal cooling for add on cards, memory and processors. If one fails, an alarm is activated and the RPM of the remaining fans increase to compensate and maintain sufficient airflow.

1-3 Mainboard Features

At the heart of the SuperServer 6041G lies the P3TDE6, a dual processor motherboard designed to provide maximum performance in a two-way system. Below are the main features of the P3TDE6.

Processors

The P3TDE6 supports dual Pentium III 500 - 1.26+ GHz MHz 100/133 MHz FSB processors. Please refer to the support section of our web site for a complete listing of supported processors (http://www.supermicro.com/TechSupport.htm).

Memory

Your P3TDE6 has four DIMM slots that can support up to 4 GB of ECC registered DIMM. Module sizes of 128MB, 256MB, 512MB and 1 GB may be populatd in the slots. The P3TDE6 supports two-way interleaved memory.

Notes on Memory:

Note 1: The memory speed must match the front side bus (FSB) speed being used (i.e. both 133 MHz or both 100 MHz).

Note 2: Memory Modules must be installed in pairs (first in the two slots of Bank0 and then in both slots of Bank1, if 4 DIMMs are needed).

Onboard SCSI

Onboard SCSI is provided with an Adaptec AIC-7899 SCSI controller chip, which supports dual channel, Ultra160 SCSI at a burst throughput rate of 160 MB/sec for each channel. The P3TDE6 provides three SCSI ports: two 68-pin LVD Ultra160 connectors (on channels A and B) and one 50-pin Legacy SCSI connector (shared with channel B.)

Expansion Slots

The P3TDE6 has a total of six PCI expansion slots that consist of two 64-bit 3.3 V 66 MHz slots and four 64-bit 5V 33 MHz slots. These PCI slots run on two separate data buses to provide a total I/O bandwidth of 792 MB/sec. In addition to the PCI slot, there is also an AGPx2 Pro slot on board.

Onboard Controllers/Ports

An onboard IDE controller supports one floppy drive and up to four UDMA/33 hard drives or ATAPI devices. Onboard I/O ports include two COM ports, a parallel port, two USB ports, PS/2 mouse and keyboard ports, a video (monitor) port and a 10/100 MB Ethernet port.

Onboard Graphics

The 6041G includes an 8 MB ATI Rage XL video card for superior graphics capabilities.

Other Features

Other onboard features that promote system health include eight voltage monitors, a chassis intrusion header, auto-switching voltage regulators, chassis and CPU overheat sensors, virus protection and BIOS rescue.

1-4 Contacting Supermicro

Headquarters

Address: SuperMicro Computer, Inc.
980 Rock Ave.
San Jose, CA 95131 U.S.A.
Tel: +1 (408) 503-8000
Fax: +1 (408) 503-8008
Email: marketing@supermicro.com (General Information)
support@supermicro.com (Technical Support)
Web Site: www.supermicro.com

Europe

Address: SuperMicro Computer B.V.
Het Sterrenbeeld 28, 5215 ML
's-Hertogenbosch, The Netherlands
Tel: +31 (0) 73-6400390
Fax: +31 (0) 73-6416525
Email: sales@supermicro.nl (General Information)
support@supermicro.nl (Technical Support)
rma@supermicro.nl (Customer Support)

Asia-Pacific

Address: SuperMicro, Taiwan
4F, No. 232-1, Liancheng Rd.
Chung-Ho 235, Taipei County
Taiwan, R.O.C.
Tel: +886-(2) 8226-3990
Fax: +886-(2) 8226-3991
Web Site: www.supermicro.com.tw
Technical Support:
Email: support@supermicro.com.tw
Tel: 886-2-8228-1366, ext.132 or 139

Chapter 2
Server Installation

2-1 Overview

This chapter provides a quick setup checklist to get your SuperServer 6041G up and running. Following these steps in the order given should enable you to have the system operating within a minimum amount of time. This quick setup assumes that your SuperServer 6041G system has come to you with the processors and memory preinstalled. If your system is not already fully integrated with a motherboard, processors, system memory etc., please turn to the chapter or section noted in each step for details on installing the specific component.

2-2 Unpacking the SuperServer 6041G

You should inspect the box the SuperServer 6041G was shipped in and note if it was damaged in any way. If the server itself shows damage you should file a damage claim with the carrier who delivered it.

Decide on a suitable location for the rack unit that will hold the SuperServer 6041G. It should be situated in a clean, dust-free area that is well ventilated. Avoid areas where heat, electrical noise and electromagnetic fields are generated. You will also need it placed near a grounded power outlet. Read the Rack and Server Precautions in the next section.

2-3 Preparing for Setup

The box the SuperServer 6041G was shipped in should include two sets of rail assemblies, two rail mounting brackets and the mounting screws you will need to install the system into the rack. Follow the steps in the order given to complete the installation process in a minimum amount of time. Please read this section in its entirety before you begin the installation procedure outlined in the sections that follow.

Choosing a Setup Location

- Leave enough clearance in front of the rack to enable you to open the front door completely (~25 inches).
- Leave approximately 30 inches of clearance in the back of the rack to allow for sufficient airflow and ease in servicing.
- This product is for installation only in a Restricted Access Location (dedicated equipment rooms, service closets, etc.).

Warnings and Precautions!

Rack Precautions

- Ensure that the leveling jacks on the bottom of the rack are fully extended to the floor with the full weight of the rack resting on them.
- In single rack installation, stabilizers should be attached to the rack.
- In multiple rack installations, the racks should be coupled together.
- Always make sure the rack is stable before extending a component from the rack.
- You should extend only one component at a time - extending two or more simultaneously may cause the rack to become unstable.

Server Precautions

- Review the electrical and general safety precautions in Chapter 4.
- Determine the placement of each component in the rack *before* you install the rails.
- Install the heaviest server components on the bottom of the rack first, and then work up.
- Use a regulating uninterruptible power supply (UPS) to protect the server from power surges and voltage spikes and to keep your system operating in case of a power failure.
- Allow the hot plug SCSI drives and power supply units to cool before touching them.
- Always keep the rack's front door and all panels and components on the servers closed when not servicing to maintain proper cooling.

2-4 Installing the SuperServer 6041G into a Rack

This section provides information on installing the SuperServer 6041G into a rack unit. If the 6041G has already been mounted into a rack, you can skip ahead to Sections 2-5 and 2-6. There are a variety of rack units on the market, which may mean the assembly procedure will differ slightly. The following is a guideline for installing the 6041G into a rack with the rack rails provided. You should also refer to the installation instructions that came with the rack unit you are using.

Identifying the Sections of the Rack Rails

You should have received two rack rail assemblies with the SuperServer 6041G. Each of these assemblies consist of three sections: an inner fixed chassis rail that secures to the 6041G (A), an outer fixed rack rail that secures directly to the rack itself (B), and a sliding rail guide (C) between the two, which should remain attached to the fixed rack rail. (See Figure 2-1, which shows the chassis rail 'A' already attached to the chassis).

The first thing you must do is to remove the fixed chassis rail (A) from each assembly. To do this, pull this inner rail out as far as possible - you should hear a "click" sound as a locking tab emerges from inside the rail assembly and locks the inner rail. Depress the locking tab to pull the inner rail completely out.

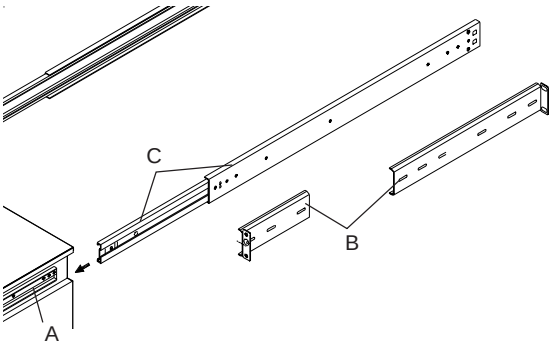


Figure 2-1. Identifying the Sections of the Rack Rails

Installing the Chassis Rails

Position the fixed chassis rail sections you just removed along the side of the 6041G chassis making sure the five screw holes line up. Be aware that these two rails are left/right specific. Screw the rail securely to the side of the chassis (see Figure 2-2). Repeat this procedure for the other rail on the other side of the chassis.

Locking Tabs: As you have seen, both chassis rails have a locking tab, which serves two functions. The first is to lock the server into place when installed and pushed fully into the rack, which is its normal position. These tabs also lock the server in place when fully extended from the rack. This prevents the server from coming completely out of the rack when you pull it out for servicing.

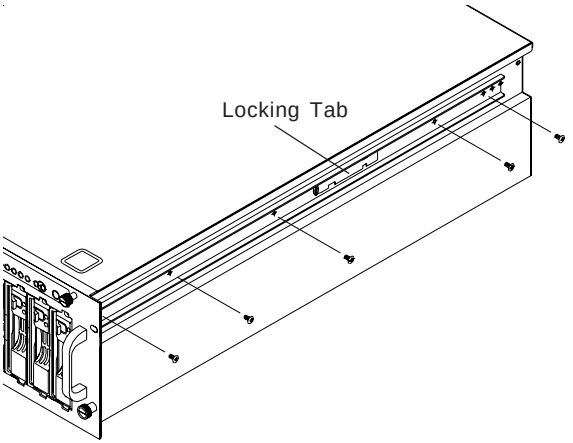


Figure 2-2. Installing the Chassis Rails

Installing the Rack Rails

Determine where you want to place the SuperServer 6041G in the rack. (See Rack and Server Precautions in Section 2-3.) Position the fixed rack rail/sliding rail guide assemblies at the desired location in the rack, keeping the sliding rail guide facing the inside of the rack. Screw the assembly securely to the rack using the brackets provided. Attach the other assembly to the other side of the rack, making both are at the exact same height and with the rail guides facing inward (see Figure 2-3).

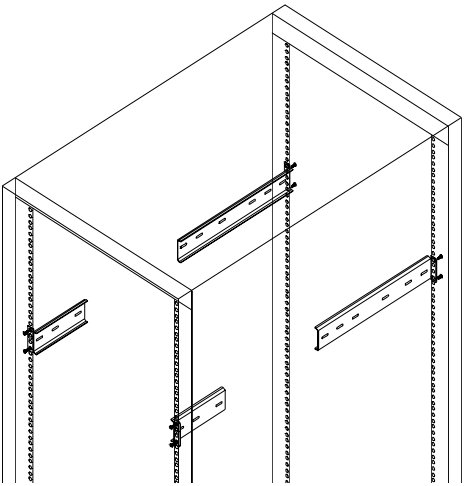


Figure 2-3. Installing the Rack Rails

Installing the Server Into the Rack

You should now have rails attached to both the chassis and the rack unit. The next step is to install the server into the chassis. Do this by lining up the rear of the chassis rails with the front of the rack rails. Slide the chassis rails into the rack rails, keeping the pressure even on both sides (you may have to depress the locking tabs when inserting). See Figure 2-4 on the next page.

When the server has been pushed completely into the rack, you should hear the locking tabs "click". Finish by inserting and tightening the thumbscrews that hold the front of the server to the rack.

*For best results, the rack cabinet depth should be 900 mm or more.

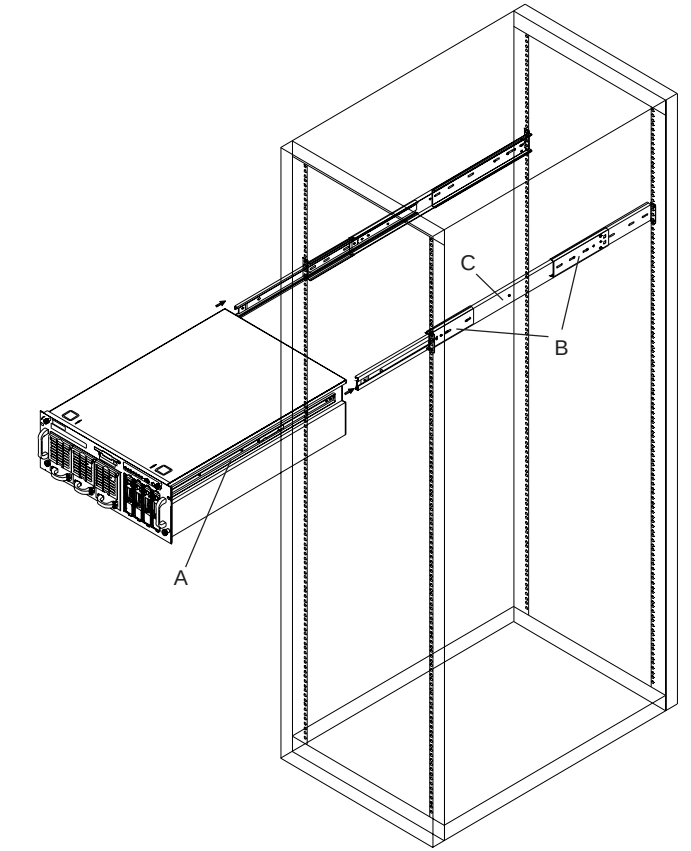


Figure 2-4. Installing the Server Into the Rack

2-5 Checking the Motherboard Setup

After you install the 6041G in the rack, you will need to open the unit to make sure the motherboard is properly installed and all the connections have been made.

1. **Access the inside of the 6041G (see Figure 2-5)**
   First, release the retention screws that secure the unit to the rack. Next, release the two thumbscrews that secure the top cover to the chassis. Grasp the two handles on either side and pull the unit straight out until it locks (you will hear a "click"). There are two square recesses in the top cover to help you push the cover away from you until it stops. You can then lift the top cover from the chassis. You now have full access to the inside of the server.

2. **Check the CPUs (processors)**
   You should have one or two processors fully inserted into the system board. If one CPU is used, install the CPU into CPU Socket 1 (see Chapter 5). Inadequte ventilation or improper installation of the CPU heat sinks may result in the instability of the system. When installing the heat sinks, use the proper type of thermal glue and apply the proper amount of thermal glue on the die of the CPU. improper type or amount of thermal glue used on the die of the CPU and improper installation of the heat sink may result in the crash of the system.

3. **Verify the proper CPU core/bus ratio setting**
   You need to verify that the CPU core/bus ratio as set with DIP Switch 1 matches the speed of your installed processors. This DIP Switch is defaulted to 5.5, which corresponds to 550 MHz processors running on a 100 MHz front side bus (FSB). If the setting is different or if you are using processors of a different speed, you may need to change this setting.

4. **Check all cable connections and airflow**
   Make sure all power and data cables are properly and firmly connected and not blocking the airflow.

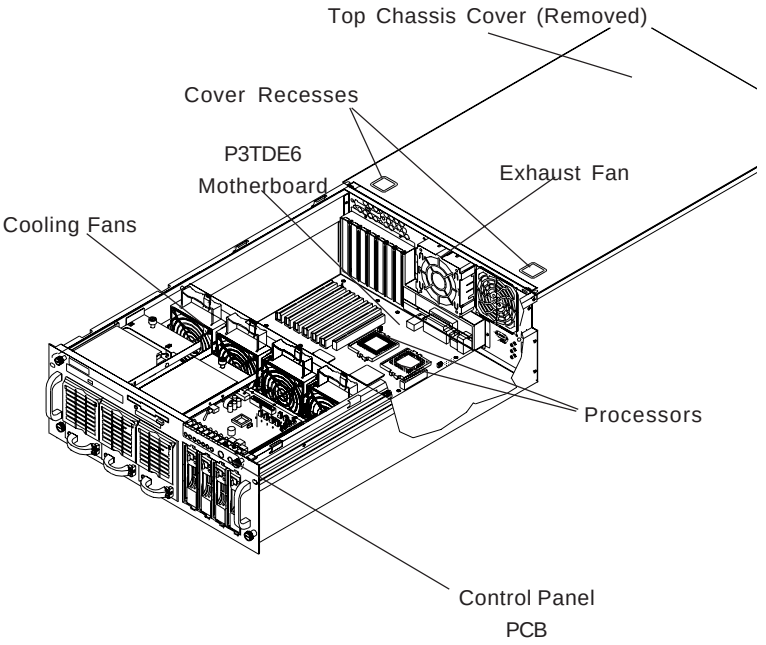


Figure 2-5. Accessing the Inside of the SuperServer 6041G

2-6 Checking the Drive Bay Setup

Next, you should check to make sure the peripheral drives and the SCA drives and backplane have been properly installed and all connections have been made.

1. Accessing the drive bays

All drives can be accessed from the front of the server. For servicing the CD-ROM and floppy drives, you will need to remove the top chassis cover. The SCSI disk drives can be installed and removed from the front of the chassis without removing the top chassis cover.

2. Install a CD-ROM and floppy disk drives

Refer to Section 6-4 if you need to reinstall a CD-ROM and/or floppy disk drive to the system.

3. Check the SCSI disk drives

Depending upon your system's configuration, your system may have some SCSI drives already installed. If you need to install SCSI drives, please refer to Section 6-4.

4. Check the airflow

Airflow is provided by four hot-swap input fans and one exhaust fan, all of which are 9-cm in size. An air shroud has been installed to direct sufficient cooling air to the processors, which generate the most heat. Also note that all power and data cables have been routed in such a way that they do not block the airflow generated by the fans.

5. Supply power to the system

The last thing you must do is supply power to the system. Plug two or all three power cords from the two power supply units into a high-quality power strip that offers protection from electrical noise and power surges. It is recommended that you use an uninterruptible power supply (UPS).

Notes

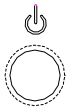
Chapter 3
System Interface

3-1 Overview

There are several LEDs on the control panel as well as others on the power supply units, the SCSI drive carriers and the motherboard to keep you constantly informed of the overall status of the system as well as the activity and health of specific components. There are also three switches that allow you to take action based on the information provided by these LEDs. This chapter explains the meanings of all LED indicators and audible alarms and the appropriate response you may need to take.

3-2 Control Panel Switches

There are three push-button switches located on the front of the chassis. These are (in order from left to right) a power on/off switch, an alarm disable switch and a reset switch.



- **POWER:** This is the main power switch, which is used to apply or turn off the power supplied to the power supply units on the 6041G.

- **ALARM:** Depressing the alarm switch will disable the audible alarm, which is generated to notify you of chassis overheating or a fan/power supply failure. The LED indicating the cause of the alarm will remain illuminated after the audible alarm is disabled.

- **RESET:** The reset switch reboots the system.

3-3 Control Panel LEDs

The control panel located on the front of the SC840 chassis has seven LEDs. These LEDs provide you with critical information related to different parts of the system. This section explains what each LED indicates when illuminated and any corrective action you may need to take.

- **Power:** Indicates power is being supplied to the system's power supply units. This LED should normally be illuminated when the system is operating.

- **NIC:** Indicates network activity on the system when flashing.

- **HDD:** Indicates IDE channel activity. On the SuperServer 6041G, this light indicates CD-ROM drive activity when flashing.

- **PWR Fault:** Indicates a power supply failure. This should be accompanied by an audible alarm, which you can disable with the alarm switch on the control panel. Inspect the power supply units at the front left of the chassis. The unit with the red LED illuminated has failed. Refer to Section 6-5 for instructions on replacing the failed unit. Because the power sup-

plies are hot-plug units, you do not need to remove power from the system when replacing. (The third power supply unit is a backup that activates automatically to keep power supplied to the system.)

- **Fan Fail:** Indicates a system fan failure. This may be one or more of the four hot-swap intake fans or the one exhaust fan. A fan failure is accompanied by an audible alarm, which you can disable with the alarm switch on the control panel. When a fan stops working, all the other system fans will increase their RPM to compensate until the failed unit is replaced. (See Section 6-2 for more details.) Refer to Section 6-3 for instructions on replacing system fans. It is unnecessary to power down the system as these are hot-swap fans. **Note:** You must use the exact same brand and rating of fan for replacement. These can be obtained directly from Supermicro.

- **Overheat:** Indicates an overheat condition in the chassis. This may be caused by cables obstructing the airflow in the system, or the ambient room temperature being too warm. You should also check to make sure that the chassis cover is installed and that all fans are present and operating normally.

- **SCA Channel:** Indicates an overheat condition in the area of the SCA SCSI drives and backplane. This may be caused by cables obstructing the airflow in the system, or the ambient room temperature being too warm. You should also check to make sure that the chassis cover is installed and that all fans are present and operating normally.

3-4 SCSI Drive Carrier LEDs

Each SCSI drive carrier has two LEDs.

- **Green:** When illuminated, the green LED on the front of the SCSI drive carrier indicates drive activity. A connection to the SCSI SCA backplane enables this LED to blink on and off when that particular drive is being accessed.

- **Red:** When illuminated, the red LED on the front of the SCSI drive carrier indicates the drive has experienced a fault or has crashed. Please refer to Section 6-4 for instructions on replacing failed SCSI drives.

3-5 Power Supply LEDs

Each of the two separate power units that comprise the power supply has a single LED that can be illuminated either as green or red.

- **Green:** When green, the power unit has power applied to it and is operating normally.

- **Red:** A red LED is normal only when system power has been turned off. If the LED is red, it indicates that either (1) no power is being applied to that particular power unit or (2) that particular power unit has failed. First check to make sure the power cord for that unit is plugged into both the power unit and a grounded wall outlet/power strip. If the power cord is properly connected, not, refer to Section 6-5 for instructions on replacing the power supply unit.

3-6 Motherboard LED

There is only one LED on the motherboard. When illuminated, it indicates that system power is present on the motherboard. This LED is located at the lower right hand corner of the P3TDE6 when installed in and viewed from the front of the rackmount chassis. This LED provides the same indication as the Power LED on the control panel.

Chapter 4
System Safety

4-1 Electrical Safety Precautions

Basic electrical safety precautions should be followed to protect yourself from harm and the SuperServer6041G from damage:

- Be aware of the locations of the power on/off switch on the chassis as well as the room's emergency power-off switch, disconnection switch or electrical outlet. If an electrical accident occurs, you can then quickly remove power from the system.

- Do not work alone when working with high voltage components.

- Power should always be disconnected from the system when removing or installing main system components, such as the motherboard, memory modules and IDE and floppy drives. When disconnecting power, you should first power down the system with the operating system first and then unplug the power cords of all the power supply units in the system.

- When working around exposed electrical circuits, another person who is familiar with the power-off controls should be nearby to switch off the power if necessary.

- Use only one hand when working with powered-on electrical equipment. This is to avoid making a complete circuit, which will cause electrical shock. Use extreme caution when using metal tools, which can easily damage any electrical components or circuit boards they come into contact with.

- Do not use mats designed to decrease static electrical discharge as protection from electrical shock. Instead, use rubber mats that have been specifically designed as electrical insulators.

- The power supply power cords must include a grounding plug and must be plugged into grounded electrical outlets.

- Motherboard Battery: **CAUTION** - There is a danger of explosion if the onboard battery (located near the DIMM modules) is installed upside down, which will reverse its polarity (see Figure 4-1). This battery must be replaced only with the same or an equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions.

- CD-ROM Laser: **CAUTION** - this server may have come equipped with a CD-ROM drive. To prevent direct exposure to the laser beam and hazardous radiation exposure, do not open the enclosure or use the unit in any unconventional way.

4-2 General Safety Precautions

Follow these rules to ensure general safety:

- Keep the area around the SuperServer 6041G clean and free of clutter.

- The SuperServer 6041G weighs approx. 67 lbs. (30.5 kg.) when fully loaded. When lifting the system, two people at either end should lift slowly with their feet spread out to distribute the weight. Always keep your back straight and lift with your legs.

- Place the chassis top cover any system components that have been removed away from the system or on a table so that they won't accidentally be stepped on.

- While working on the system, do not wear loose clothing such as neckties and unbuttoned shirt sleeves, which can come into contact with electrical circuits or be pulled into the one of the cooling fans.

- Remove any jewelry or metal objects from your body, which are excellent metal conductors that can create short circuits and harm you if they come into contact with printed circuit boards or areas where power is present.

- After accessing the inside of the system, close the system back up and secure it to the rack unit with the retention screws after ensuring that all connections have been made.

4-3 ESD Precautions

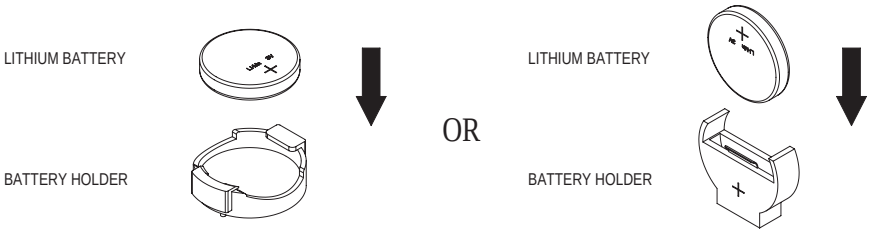
Electrostatic discharge (ESD) is generated by two objects with different electrical charges coming into contact with each other. An electrical discharge is created to neutralize this difference, which can damage electronic components and printed circuit boards. The following measures are generally sufficient to neutralize this difference before contact is made to protect your equipment from ESD:

- Use a grounded wrist strap designed to prevent static discharge.
- Keep all components and printed circuit boards (PCBs) in their antistatic bags until ready for use.
- Touch a grounded metal object before removing the board from the antistatic bag.
- Do not let components or PCBs come into contact with your clothing, which may retain a charge even if you are wearing a wrist strap.
- Handle a board by its edges only; do not touch its components, peripheral chips, memory modules or contacts.
- When handling chips or modules, avoid touching their pins.
- Put the motherboard and peripherals back into their antistatic bags when not in use.
- For grounding purposes, make sure your computer chassis provides excellent conductivity between the power supply, the case, the mounting fasteners and the motherboard.

4-4 Operating Precautions

Care must be taken to assure that the chassis cover is in place when the 6041G is operating to assure proper cooling. Out of warranty damage to the 6041G system can occur if this practice is not strictly followed.

Figure 4-1. Installing the Onboard Battery



Chapter 5
Advanced Motherboard Setup

This chapter covers the steps required to install the P3TDE6 motherboard into the SC840 chassis, connect the data and power cables and install add-on cards. All motherboard jumpers and connections are also described. A layout and quick reference chart are on pages 5-10 and 5-11. Remember to completely close the chassis when you have finished working with the motherboard to better cool and protect the system.

Tools Required

The only tools you will need to install the P3TDE6 into the chassis are a long and a short Philips screwdriver.

5-1 Handling the P3TDE6 Motherboard

Static electrical discharge can damage electronic components. To prevent damage to any printed circuit boards (PCBs), it is important to handle them very carefully (see previous chapter). Also note that the size and weight of the P3TDE6 motherboard can cause it to bend if handled improperly, which may result in damage. To prevent the P3TDE6 motherboard from bending, keep one hand under the center of the board to support it when handling. The following measures are generally sufficient to protect your equipment from static discharge.

Precautions

- Use a grounded wrist strap designed to prevent static discharge.
- Touch a grounded metal object before removing any board from its anti-static bag.
- Handle a board by its edges only; do not touch its components, peripheral chips, memory modules or gold contacts.
- When handling chips or modules, avoid touching their pins.
- Put the motherboard, add-on cards and peripherals back into their anti-static bags when not in use.

- For grounding purposes, make sure your computer chassis provides excellent conductivity between the power supply, the case, the mounting fasteners and the motherboard.

Unpacking

The motherboard is shipped in antistatic packaging to avoid static electrical damage. When unpacking the board, make sure the person handling it is static protected.

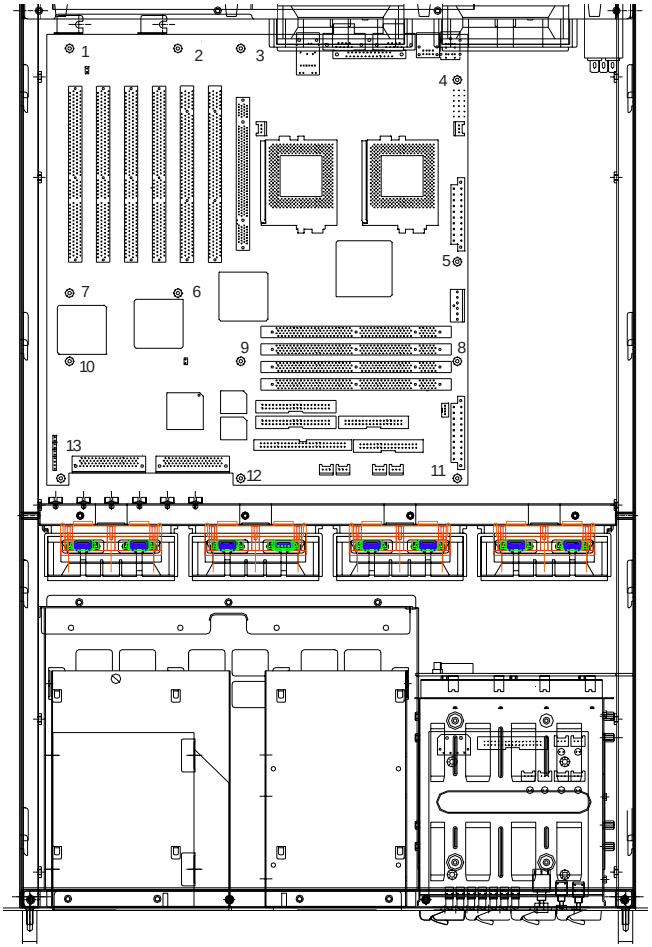
5-2 Motherboard Installation

This section explains the first step of physically mounting the P3TDE6 into the SC840 chassis. Following the steps in the order given will eliminate the most common problems encountered in such an installation. To remove the motherboard, follow the procedure in reverse order.

1. **Access the inside of the 6041G (see Figure 2-5)**
   First, release the two retention screws that secure the unit to the rack. Grasp the two handles on either side and pull the unit straight out. Next, release the two screws that secure the top cover to the chassis. Remove the top chassis cover by pushing forward on the cover recesses until it stops. Lift the cover from the chassis. You should now have full access to the inside of the server.

2. **Install metal standoffs**
   With the chassis opened up, the motherboard tray is directly in front of you. First, check that the location of all the mounting holes on both the motherboard and the tray match. Refer to Figure 5-1 for mounting hole locations. Attach metal standoffs to the mounting holes (as marked #1-13 on Figure 5-1) on the motherboard tray. Make sure these metal standoffs either click in or are screwed in tightly. Several square rubber "feet" may be applied to the motherboard tray to function as shock absorbers. Attach these feet to the small square outlines on the tray.

3. **Check compatibility of motherboard ports and I/O shield**
   The P3TDE6 requires a chassis big enough to support a 12" x 13" motherboard, such as Supermicro's SC840 4U rackmount. Make sure that the I/O ports on the motherboard properly align with their respective holes in the I/O shield at the back of the chassis.



Number of motherboard mounting holes: 13

Figure 5-1. Mounting Holes on Motherboard (top view)

4. Mount the motherboard onto the motherboard tray

Carefully mount the motherboard to the motherboard tray by aligning the board holes with the metal standoffs you just installed. Insert screws into all the mounting holes provided and tighten until snug. **Note:** To prevent the screw heads from making direct contact with the MB traces (which will create an electrical short) you may place washers on top of the mounting holes before inserting screws into the holes.

5-3 Connecting Cables

Now that the motherboard is installed, the next step is to connect the cables to the board. These include the data (ribbon) cables for the peripherals and front control panel, the power fail signal (PWR P) cable and the power cables.

Connecting Data Cables

The ribbon cables used to transfer data from the peripheral devices have been carefully routed to prevent them from blocking the flow of cooling air that moves through the system from front to back. If you need to disconnect any of these cables, you should take care to keep them routed as they were originally after reconnecting them (make sure the red wires connect to the pin 1 locations). The following data cables (with their locations noted) should be connected. (See the layout on page 5-12 for connector locations.)

- IDE Device Cables (J13 and J14)
- Floppy Drive Cable (J15)
- SCSI Device Cables (JA2, JA4 and JP60)
- Control Panel Cable (JF1, see next page)
- Power Fail Signal Cable (PWR P)

Connecting Power Cables

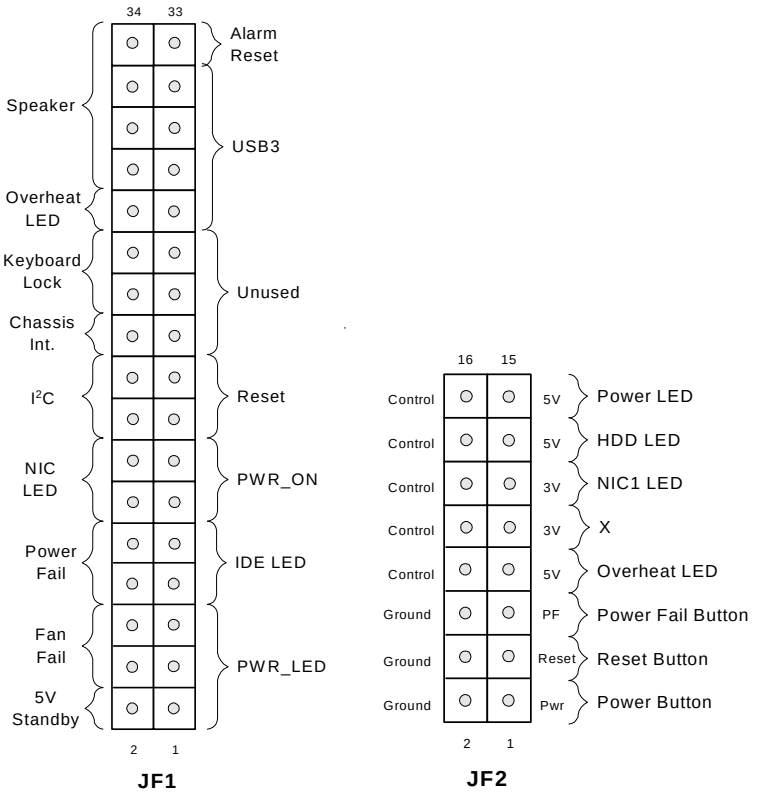
The P3TDE6 has two primary power supply connectors: ATX Power #1 and ATX Power #2. You must connect both the primary *and* the secondary ATX power connectors to your power supply. See the layout on page 5-12 for connector locations.

Connecting the Control Panel

The JF2 header on the P3TDE6 contains header pins for various control panel connectors. See Figure 5-2 for the locations of the power and reaset buttons and LEDs for overheat, NIC1, NIC2, the IDE hard disk drive and power. Note that even and odd numbered pins are on opposite sides of the connector. All JF2 wires have been bundled into a single ribbon cable to simplify the connection to the 840 chassis. Make sure the red wire plugs into pin 1 as marked on the board. The other end connects to the Control Panel PCB board, located just behind the system status LEDs on the chassis. See Section 5-8 for details (and pin descriptions for JF1).

JF1 also contains pins for these and other functions. JF1 was designed for use with other chassis and is not used in the SuperServer 6041G.

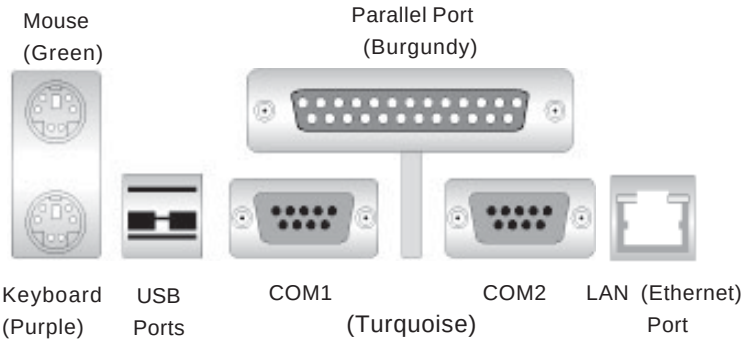
Figure 5-2. Control Panel Connectors



5-4 I/OPorts/Control Panel Connectors

The I/O ports are color coded in conformance with the PC 99 specification. See Figure 5-3 below for the colors and locations of the various I/O ports.

Figure 5-3. I/O Port Locations and Definitions



5-5 Processor Installation

When handling the processor package, avoid placing direct pressure on the label area of the fan.

This section covers the installation procedure for 370-pin socket processors. You should install the processor first and then install the motherboard in the chassis. Following the installation procedures in the order they appear in this section should eliminate the most common problems encountered when installing a system.

IMPORTANT: Always connect the power cord last and always remove it before adding, removing or changing any hardware components.

Heatsink

Follow the instructions that came with your processor or heatsink to attach a heatsink to the processor. Your heatsink should have a 3-pin fan, which connects to the CPU FAN header. Make sure that good contact is made between the CPU chip (the die) and the heatsink. Insufficient contact or improper types of heatsinks, thermal compound or fans can cause the processor to overheat, which may crash the system. (You can check the CPU temperature readings in the "Peripheral Setup" Section of BIOS.)

Processor

Your motherboard has two 370-pin sockets, which support Intel FCPGA processors. Lift the lever on the socket and insert the processor with the notched corner oriented toward pin one on the socket. Make sure the processor is fully seated in the socket and and then close the lever. You can also install a single 370-pin CPU in CPU Socket 1 without changing any jumper settings. See Figure 5-3 for views of the 370-pin socket before and after processor installation.

Mounting the Motherboard in the Chassis

All motherboards have standard mounting holes to fit different types of chassis. Make sure the location of all the mounting holes for both the motherboard and the chassis match. Although a chassis may have both plastic and metal mounting fasteners, metal ones are highly recommended because they ground the motherboard to the chassis. Make sure the metal standoffs click in or are screwed in tightly. Then use a screwdriver to secure the motherboard onto the motherboard tray.

5-4 370-pin Socket: Empty and with Processor Installed

Removing Pentium III 370-pin Processors

To remove the Pentium III 370-pin processors from the motherboard, follow the installation process in reverse order.

When removing a Pentium III 370-pin processor, avoid pressing down on the motherboard or any of its components.

5-6 Installing DIMMs

CAUTION

Exercise extreme care when installing or removing DIMM modules to prevent any possible damage. Also note that the memory is interleaved to improve performance (see step 1).

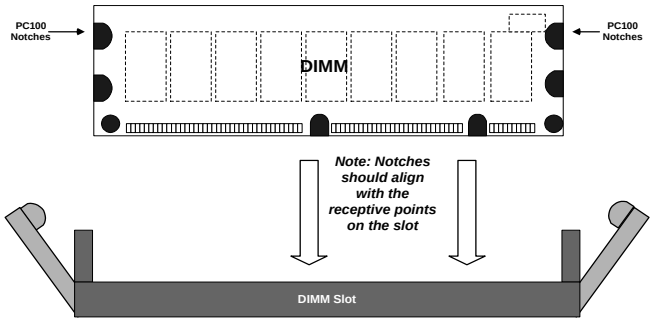
DIMM Installation (See Figure 5-4)

1. Insert either two or four DIMMs as required for the desired system memory. Two-way interleaved memory requires that memory modules be installed in pairs (first in the two slots of Bank0 and then in both slots of Bank if needed).
2. Insert each DIMM module vertically into its slot. Pay attention to the two notches along the bottom of the module to prevent inserting the DIMM module incorrectly.
3. Gently press down on the DIMM module until it snaps into place in the slot. Repeat for all modules (see step 1 above).

Support

The P3TDE6 only supports ECC registered SDRAM memory. PC133 and PC100 memory are both supported at their respective speeds. However, the memory speed is synchronized with CPU's front side bus speed. Therefore, the FSB of the CPU will determine the memory speed.

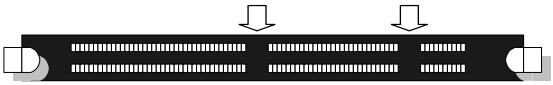
Figure 5-5. DIMM Installation



To Install: Insert module vertically and press down until it snaps into place. Pay attention to the notches.

To Remove: Use your thumbs to gently push near the edge of both ends of the module. This should release it from the slot.

Top View of DIMM Slot



5-7 Adding PCI Cards

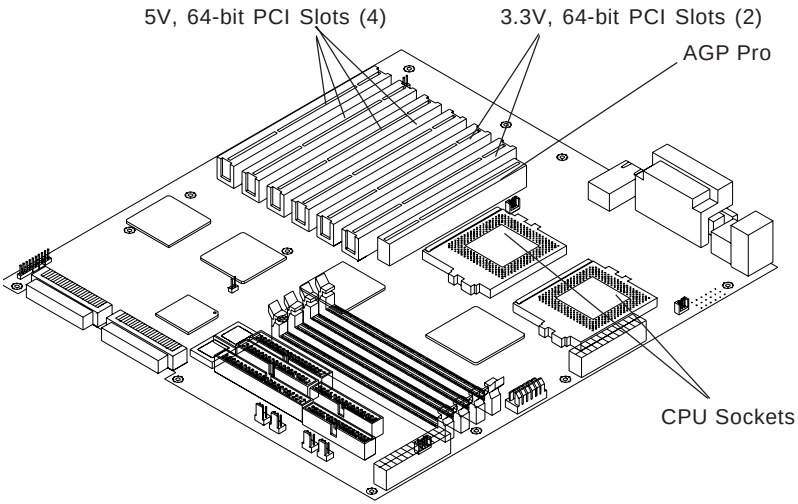
1. 64-bit PCI slots:

The P3TDE6 has six 64-bit PCI slots. Two of these are 64-bit 66 MHz slots that are keyed to only accept 66 MHz, 3.3V PCI cards. The other four 64-bit, 5V PCI slots also support 3.3V and run at 33MHz. These four slots are fully compatible with 32-bit PCI devices.

2. PCI card installation:

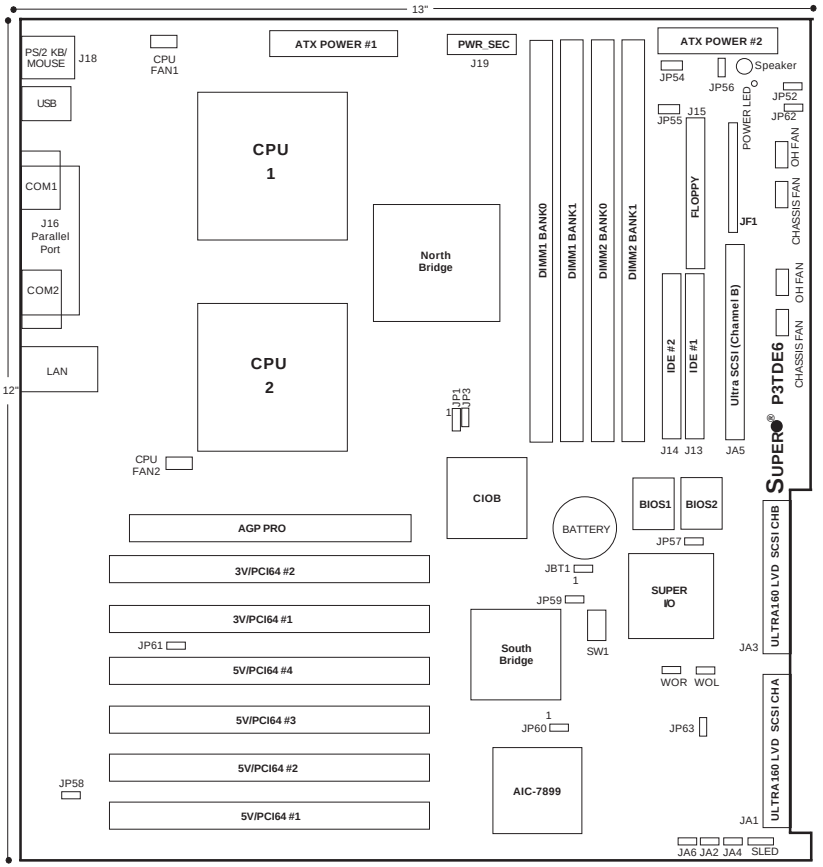
You are now ready to install your PCI add-on cards. Make sure you choose the correct slot for the type of card you are installing (see Step 1). First, remove the I/O shield for the proper slot. Then fully seat the card into the slot, pushing down with your thumbs evenly on both sides of the card. Finish by using a screw to secure the top of the card shield to the chassis. The I/O shields protect the motherboard and its components from EMI (electromagnetic interference)and aid in proper ventilation, so make sure there is a shield covering each slot.

Figure 5-6. Adding PCI Cards



Notes

Figure 5-7. SUPER P3TDE6 Layout
(not drawn to scale)



Note: Memory modules must be installed in pairs. Jumpers not indicated are for test purposes only.

Also see Figures 5-2 and 5-3 for the locations of the I/O ports and the Front Control Panel (JF1) connectors. See Section 5-8 for details on jumper settings and pin definitions.

P3TDE6 Quick Reference

Jumper	Description	Default Setting
JA2	LVD SCSI Ch A Term.	Open (Enabled)
JA4	LVD SCSI Ch B Term.	Open (Enabled)
JA6	50pin SCSI Ch B Term	Open (Enabled)
JBT1	CMOS Clear	Pins 1-2 (Normal)
JP1	FSB Speed Setting	Pins 1-2 (Auto)
JP3	Spread Spectrum Enable	Open (Disabled)
JP55	Third P/S Fail Enable/Disable	On (Enabled)
JP56	Speaker Enable/Disable	On (Enabled)
JP57	BIOS Select	Pins 1-2 (BIOS1)
JP58	LAN/NIC Enable/Disable	Off (Enabled)
JP60	SCSI Enable/Disable	Pins 1-2 (Enabled)
JP61	PCI 66/33 MHz Select	On (33 MHz)
JP62	Thermal Fan Enable/Disable	On (Enabled)

DIP Switch	Description
SW1(1-4)	CPU Core/Bus Ratio

Connector	Description
ATX POWER #1	Primary ATX Power Connector
ATX POWER #2	Secondary ATX Power Connector
BANK0-BANK1	Memory (RAM) Slots
COM1/COM2	COM1/COM2 Serial Port Connector
CPU1/CPU2	CPU 1 and CPU2 Sockets
CPU/CH/OH FAN	CPU/Chassis/Overheat Fan Headers
J13, J14	IDE Hard Disk Drive Connectors
J15	Floppy Disk Drive Connector
J16	Parallel Printer Port
J18	PS/2 Keyboard/Mouse Ports
JA1	Ultra160 LVD SCSI CH A Connector
JA3	Ultra160 LVD SCSI CH B Connector
JF1	Front Control Panel Connector
JP52	Chassis Intrusion Header
JP54	Third Power Supply Fail Header
JP63	NMI (Non-Maskable Interrupt) Header
LAN	Ethernet Port
PWR_SEC	Secondary ATX Power Connector
SLED1	SCSI Active LED header
USB	Universal Serial Bus Ports
WOL	Wake-on-LAN Header
WOR	Wake-on-Ring Header

5-8 Connector Definitions

Power Supply Connector

After you have mounted the motherboard and added memory and PCI cards, you are ready to connect the cables. Attach an ATX power supply cable to ATX #1. See the table on the right for the pin definitions of these ATX power supply connectors.

ATX Power Supply Connector Pin Definitions

Pin Number	Definition	Pin Number	Definition
1	3.3V	11	3.3V
2	3.3V3	12	-12V
3	Ground	13	Ground
4	5V	14	PS-ON
5	Ground	15	Ground
6	5V	16	Ground
7	Ground	17	Ground
8	PW-OK	18	-5V
9	5VSB	19	5V
10	12V	20	5V

Secondary Power Connector

Use of the secondary power connector at J19 is recommended when a heavy load of peripherals has been added to the motherboard. See the table at right for pin definitions. ***Note: Be sure to use a 6-pin connector and check the power supply layout before making the connection.***

Secondary Power Connector (J19)

Pin Number	Definition
1	Ground
2	Ground
3	Ground
4	+3.3V
5	+3.3V
6	+5V (keyed)

Power Button

The Power Button connection is located on pins 1 and 2 of JF2. Momentarily contacting both pins will power on/off the system. The user can also configure this button to function as a suspend button (see the Power Button Mode setting in BIOS). To turn off the power when set to suspend mode, hold down the power button for at least 4 seconds. See Figure 5-2 for pin definitions. See the table on the right for pin definitions on JF1 (PWR_ON).

PWR_ON Connector Pin Definitions (JF1)

Pin Number	Definition
11	PW_ON
13	Ground

Reset

The Reset connection is located on pins 3 and 4 of JF2. This connector attaches to the hardware reset switch on the computer case. See Figure 5-2 for pin definitions. See the table on the right for pin definitions on JF1.

Reset Pin Definitions (JF1)

Pin Number	Definition
15	Reset
17	Ground

Power Fail LED (PFL)

The Power Fail LED connection is located on pins 5 and 6 of JF2. See Figure 5-2 for pin definitions. See the table on the right for pin definitions on JF1.

Power Fail LED Pin Definitions (JF1)

Pin Number	Definition
8	+5V
10	PWR Fail

Overheat LED (OH)

Pins 7 and 8 on JF2 are for the overheat LED, which provides advance warning of chassis overheating. See Figure 5-2 for pin definitions. See the table on the right for pin definitions on JF1.

Overheat LED (OH) Pin Definitions (JF1)

Pin Number	Definition
26	OH Active

NIC 1 LED

The LED connection for the Network Interface Controller 1 is located on pins 11 and 12 of JF2. This header is used to display network activity for LAN1. See Figure 5-2 for pin definitions. See the table on the right for pin definitions on JF1.

NIC LED Pin Definitions (JF1)

Pin Number	Definition
12	+5V
14	GND

HDD (IDE) LED

The IDE hard drive LED connection is located on pins 13 and 14 of JF2. See Figure 5-2 for pin definitions. See the table on the right for pin definitions on JF1.

IDE LED Pin Definitions (JF1)

Pin Number	Definition
7	+5V
9	HD Active

Power LED

The Power LED connection is located on pins 15 and 16 of JF2. See Figure 5-2 for pin definitions. See the table on the right for pin definitions on JF1.

PWR_LED Pin Definitions (JF1)

Pin Number	Definition
1	+5V
3	Key
5	GND

Fan Fail

The Fan Fail LED connnection is located on pins 4 and 6 of JF1. Refer to the table on the right for pin definitions.

Fan Fail LED Pin Definitions (JF1)

Pin Number	Definition
4	+5V
6	Fan Fail

I^2C

The I^2C connection is located on pins 16 and 18 of JF1. Refer to the table on the right for pin definitions.

I^2C Pin Definitions (JF1)

Pin Number	Definition
16	SDA
18	SCL

Chassis Intrusion

A Chassis Intrusion connection is located on pin 20 of JF1. See the table on the right for pin definitions. **Note:** An extra chassis intrusion header is provided at JP52.

Chassis Intrusion Pin Definitions (JF1)

Pin Number	Definition
20	Intrusion Input

Keyboard Lock

The Keyboard Lock connection is located on pins 22 and 24 of JF1. Refer to the table on the right for pin definitions.

Keyboard Lock Pin Definitions (JF1)

Pin Number	Definition
22	+5V
24	GND

Speaker

The speaker connection is located on pins 28, 30, 32 and 34 of JF1. Refer to the table on the right for pin definitions.

Speaker Connector Pin Definitions (JF1)

Pin Number	Function	Definition
28	"+"	Red wire, Speaker PWR
30	Key	No connection
32		Key
34	"-"	Speaker data

USB3

An additional connection for USB3 is included on pins 25, 27, 29 and 31 of JF1 for front side USB access. You will need a USB cable (not included) to use this connection. Refer to the table on the right for pin definitions.

USB3 Pin Definitions (JF1)

Pin Number	Definition
25	Power
27	-
29	+
31	Ground

Fan Headers*

There are several fan headers on the P3TDE6 to provide cooling for various components. In addition to one fan header for each processor, there is one overheat and two chassis fan headers. See the motherboard layout for locations. Refer to the table on the right for pin definitions.

Note: The maximum current limitation for the onboard fans is 0.35 amps for each, not to exceed 1.2 amps for any group of four fans.

Fan Header Pin Definitions (CPU, CHASSIS and OH FAN)

Pin Number	Definition
1	Ground (black)
2	+12V (red)
3	Tachometer

Caution: These fan headers are DC power.

ATX PS/2 Keyboard and PS/2 Mouse Ports

The ATX PS/2 keyboard and the PS/2 mouse are located on J18. Refer to the table on the right for pin definitions. (The mouse port is above the keyboard port. See Figure 5-7.)

PS/2 Keyboard and Mouse Port Pin Definitions (J18)

Pin Number	Definition
1	Data
2	*NC
3	Ground
4	VCC
5	Clock
6	*NC

Universal Serial Bus (USB)

Two Universal Serial Bus connectors are located beside the keyboard/mouse ports. USB0 is the bottom connector and USB1 is the top connector.

USB0/USB1 Ports

Ethernet Port

An Ethernet port is located beside the VGA port on the I/O backplane. This port accepts RJ45 type cables. Two LEDs indicate a successful connection (yellow) and activity (green).

RJ45 Ethernet Port

Wake-On-LAN

The Wake-On-LAN header is designated as WOL. Refer to the table on the right for pin definitions. You must enable the LAN Wake-Up setting in BIOS to use this feature. You must also have a LAN card with a Wake-on-LAN connector and cable.

Wake-on-LAN Pin Definitions (WOL)

Pin Number	Definition
1	+5V Standby
2	Ground
3	Wake-up

Note: "NC" indicates "No connection".

Wake-On-Ring

The Wake-On-Ring header is designated as WOR. Refer to the table on the right for pin definitions. You must enable the Ring Wake-Up setting in BIOS to use this feature. You must also have a modem card with a WOR connector and cable to use this feature.

Wake-On-Ring Pin Definitions (WOR)

Pin Number	Definition
1	Ground
2	Wake-up

SLED1 (SCSI LED) Indicator

The SLED connector is used to provide an LED indication of SCSI activity. Refer to the table on the right for connecting the SCSI LED.

SCSI LED Pin Definitions (SLED1)

Pin Number	Definition
1	Positive
2	Negative
3	Negative
4	Positive

Chassis Intrusion

A 2-pin Chassis Intrusion header is located at JP52. When a chassis intrusion microswitch is connected to JP52 a message will be sent to the system administrator if a chassis intrusion condition is detected (activated when the top cover of the chassis is removed). See the table on the right for pin definitions.

Chassis Intrusion Header Pin Definitions (JP52)

Pin Number	Definition
1	Signal
2	Ground

I^2C Header

The I^2C header is located at JP70. See the table on the right for pin definitions.

I^2C Header Pin Definitions (JP70)

Pin Number	Definition
1	SDA
2	SCL

Serial Ports

Serial ports COM1 and COM2 are located under the parallel port (see Figure 5-3). Refer to the table on the right for pin definitions.

Serial Port Pin Definitions (COM1, COM2)

Pin Number	Definition	Pin Number	Definition
1	DCD	6	CTS
2	DSR	7	DTR
3	Serial In	8	RI
4	RTS	9	Ground
5	Serial Out	10	*NC

5-9 DIP Switch Settings

DIP Switch 1: Core/Bus Ratio

The red "DIP" Switch labeled SW1 is located on the P3TDE6. SW1 has four individual switches which are used to set the core/ bus ration. The table on the right will show you which CPU Core/ Bus Ratio to use. The general rule is to divide the CPU speed by the bus speed (133 or 100 MHz for the P3TDE6). For example, if you have a 550 MHz CPU, dividing it by 100 will give you a CPU Core/BUS Ratio of 5.5. After determining the CPU Core/Bus Ratio, refer to the table on the right for the correct settings of DIP SW 1.

Note: Most Intel Processors have a fixed Core/Bus ratio that will overwrite the setting of DIP Switch 1.

CPU Core/Bus Ratio Selection (DIP Switch1)

CPU	SW1 #4	SW1 #3	SW1 #2	SW1 #1
400-533	ON	OFF	ON	ON
450-600	ON	OFF	ON	OFF
500-666	ON	OFF	OFF	ON
550-733	ON	OFF	OFF	OFF
600-800	OFF	ON	ON	ON
650-866	OFF	ON	ON	OFF
700-933	OFF	ON	OFF	ON
750-1000	OFF	ON	OFF	OFF
800-1064	OFF	OFF	ON	ON
850-1130	OFF	OFF	ON	OFF
900-1200	OFF	OFF	OFF	ON

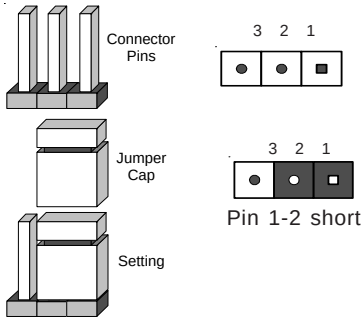
550 MHz = 100 MHz x 5.5

CPU Speed = Bus Freq. x Ratio

5-10 Jumper Settings

Explanation of Jumpers

To modify the operation of the motherboard, jumpers can be used to choose between optional settings. Jumpers create shorts between two pins to change the function of the connector. Pin 1 is identified with a square solder pad on the printed circuit board. See the motherboard layout pages for jumper locations. **Note:** On a 2-pin jumper, "Closed" means the jumper is over both pins and "Open" means the jumper is either on one pin only or completely off.



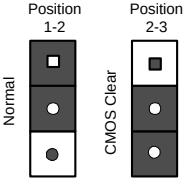
CMOS Clear

Refer to the table on the right for the jumper settings to clear CMOS. Always remove the AC power cord from the system before clearing CMOS.

NOTE: For an ATX power supply, you must completely shut down the system, remove the AC power cord and *then* use JBT1 to clear CMOS. Replace JBT1 back to the pin 1-2 position <u>before</u> powering up the system again. <u>Do not</u> use the PW_ON connector to clear CMOS.

CMOS Clear Jumper Settings (JBT1)

Jumper Position	Definition
1-2	Normal
2-3	CMOS Clear



Front Side Bus Speed

The JP1 jumper sets the FSB speed. Refer to the table on the right for a description of the jumper settings.

Front Side Bus Speed Jumper Settings (JP1)

Jumper Position	Definition
1-2	Auto
2-3	100 MHz
OFF	133 MHz

Note: The Auto setting allows the CPU to set the speed.

SCSI Termination Enable/ Disable

The SCSI Termination jumper (JP64) allows you to enable or disable termination for the SCSI connectors. The normal (default) position is open to enable SCSI termination. Refer to the table on the right for jumper settings.

SCSI Termination Enable/Disable Jumper Settings (JP64)

Jumper Position	Definition
Open	Enabled
Closed	Disabled

LVD Channel A SCSI Termination Enable/ Disable

Jumper JA2 allows you to enable or disable termination for the LVD Channel A SCSI connector. The normal (default) position is open to enable SCSI termination. Refer to the table on the right for jumper settings.

LVD CH A SCSI Termination Jumper Settings (JA2)

Jumper Position	Definition
Open	Enabled
Closed	Disabled

LVD Channel B SCSI Termination Enable/ Disable

Jumper JA4 allows you to enable or disable termination for the LVD Channel B SCSI connector. The normal (default) position is open to enable SCSI termination. Refer to the table on the right for jumper settings.

LVD CH B SCSI Termination Jumper Settings (JA4)

Jumper Position	Definition
Open	Enabled
Closed	Disabled

SpeakerEnable/Disable

You may want to disable the onboard speaker. Jumper JP56 gives you this option. Refer to the table on the right for jumper settings.

Speaker Enable/Disable Jumper Settings (JP56)

Jumper Position	Definition
Open	Disabled
Closed	Enabled

LAN1 Enable/Disable

Use jumper JP58 to enable or disable LAN1/NIC (Network Interface Card) on your motherboard. Refer to the table on the right for jumper settings.

LAN1/NIC Enable/Disable Jumper Settings (JP58)

Jumper Position	Definition
Open	Enabled
Closed	Disabled

Thermal Fan Enable/ Disable

Use jumper JP65 to enable or disable the thermal fan. When enabled, the Thermal Fan will activate when the chassis temperature reaches a predetermined temperature. Refer to the table on the right for jumper settings.

Thermal Fan Enable/Disable Jumper Settings (JP65)

Jumper Position	Definition
Open	Disabled
Closed	Enabled

PCI Speed Setting

Use jumper JP66 to set the speed of the PCI slot. Refer to the table on the right for jumper settings.

PCI Slot Speed Jumper Settings (JP66)

Jumper Position	Definition
Open	66 MHz
Closed	33 MHz

VGA Enable/Disable

Use jumper JP68 to enable or disable the VGA port. Refer to the table on the right for jumper settings.

VGA Enable/Disable Jumper Settings (JP68)

Jumper Position	Definition
Open	
Closed	

5-11 Parallel Port, Floppy/Hard Disk Drive and SCSI Connections

Use the following information to connect the floppy and hard disk drive cables.

- The floppy disk drive cable has seven twisted wires.
- A red mark on a wire typically designates the location of pin 1.
- A single floppy disk drive ribbon cable has 34 wires and two connectors to provide for two floppy disk drives. The connector with twisted wires always connects to drive A, and the connector that does not have twisted wires always connects to drive B.

Parallel (Printer) Port Pin Definitions (J16)

Pin Number	Function	Pin Number	Function
1	Strobe-	2	Auto Feed-
3	Data Bit 0	4	Error-
5	Data Bit 1	6	Init-
7	Data Bit 2	8	SLCT IN-
9	Data Bit 3	10	GND
11	Data Bit 4	12	GND
13	Data Bit 5	14	GND
15	Data Bit 6	16	GND
17	Data Bit 7	18	GND
19	ACK	20	GND
21	BUSY	22	GND
23	PE	24	GND
25	SLCT	26	NC

Parallel Port Connector

The parallel port is located on J16 and requires a 26-pin ribbon cable for operation. See the table on the left for pin definitions.

Floppy Connector

The floppy connector is located on J15 and requires a 34-pin ribbon cable for operation. See the table on the right for pin definitions.

Floppy Connector Pin Definitions (J15)

Pin Number	Function	Pin Number	Function
1	GND	2	FDHDIN
3	GND	4	Reserved
5	Key	6	FDEDIN
7	GND	8	Index-
9	GND	10	Motor Enable
11	GND	12	Drive Select B-
13	GND	14	Drive Select A-
15	GND	16	Motor Enable
17	GND	18	DIR-
19	GND	20	STEP-
21	GND	22	Write Data-
23	GND	24	Write Gate-
25	GND	26	Track 00-
27	GND	28	Write Protect-
29	GND	30	Read Data-
31	GND	32	Side 1 Select-
33	GND	34	Diskette

IDE Connectors

There are no jumpers to configure the onboard IDE connectors J13 and J14. See the table on the right for pin definitions.

IDE Connector Pin Definitions (J13, J14)

Pin Number	Function	Pin Number	Function
1	Reset IDE	2	GND
3	Host Data 7	4	Host Data 8
5	Host Data 6	6	Host Data 9
7	Host Data 5	8	Host Data 10
9	Host Data 4	10	Host Data 11
11	Host Data 3	12	Host Data 12
13	Host Data 2	14	Host Data 13
15	Host Data 1	16	Host Data 14
17	Host Data 0	18	Host Data 15
19	GND	20	Key
21	DRQ3	22	GND
23	I/O Write-	24	GND
25	I/O Read-	26	GND
27	IOCHRDY	28	BALE
29	DACK3-	30	GND
31	IRQ14	32	IOCS16-
33	Addr 1	34	GND
35	Addr 0	36	Addr 2
37	Chip Select 0	38	Chip Select 1-
39	Activity	40	GND

Ultra160 SCSI Connectors

See the table on the right for pin definitions of the Ultra160 SCSI connectors located at JA1, JA3 and JA5.

68-pin Ultra160 SCSI Connectors (JA1, JA3, JA5)

Connector Contact Number	Signal Names	Connector Contact Number	Signal Names
1	+DB(12)	35	-DB(12)
2	+DB(13)	36	-DB(13)
3	+DB(14)	37	-DB(14)
4	+DB(15)	38	-DB(15)
5	+DB(P1)	39	-DB(P1)
6	+DB(0)	40	-DB(0)
7	+DB(1)	41	-DB(1)
8	+DB(2)	42	-DB(2)
9	+DB(3)	43	-DB(3)
10	+DB(4)	44	-DB(4)
11	+DB(5)	45	-DB(5)
12	+DB(6)	46	-DB(6)
13	+DB(7)	47	-DB(7)
14	+DB(P)	48	-DB(P)
15	GROUND	49	GROUND
16	DIFFSENS	50	GROUND
17	TERMPWR	51	TERMPWR
18	TERMPWR	52	TERMPWR
19	RESERVED	53	RESERVED
20	GROUND	54	GROUND
21	+ATN	55	-ATN
22	GROUND	56	GROUND
23	+BSY	57	-BSY
24	+ACK	58	-ACK
25	+RST	59	-RST
26	+MSG	60	-MSG
27	+SEL	61	-SEL
28	+C/D	62	-C/D
29	+REQ	63	-REQ
30	+I/O	64	-I/O
31	+DB(8)	65	-DB(8)
32	+DB(9)	66	-DB(9)
33	+DB(10)	67	-DB(10)
34	+DB(11)	68	-DB(11)

5-12 IRQs

Some PCI bus mastering devices share IRQs (Interrupt Requests) without performance penalties. See the table below for details on shared IRQs.

IRQ	Device
IRQ# 0, 1	5V. 64-bit/33MHz PCI slot 1(J7)
IRQ# 2, 3	5V. 64-bit/33MHz PCI slot 2 (J6)
IRQ# 4, 5	5V. 64-bit/33MHz PCI Slot 3 (J8)
IRQ# 6, 7	3.3V. 64-bit/66 MHz PCI Slot 1 (J11)
IRQ# 8, 9	3.3V. 64-bit/66 MHz PCI Slot 2 (J10)
IRQ# 10, 11	Onboard SCSI slot
IRQ# 12, 13	5V. 64-bit/33MHz PCI Slot 4 (J9)
IRQ# 14	AGP slot
IRQ# 15	Onboard LAN slot

Chapter 6
Advanced Chassis Setup

This chapter covers the steps required to install components and perform maintenance on the SC840 chassis. For component installation, follow the steps in the order given to eliminate the most common problems encountered. If some steps are unnecessary, skip ahead to the step that follows.

Tools Required

The only tool you will need to install components and perform maintenance is a Philips screwdriver.

6-1 Static-Sensitive Devices

Electric Static Discharge (ESD) can damage electronic components. To prevent damage to any printed circuit boards (PCBs), it is important to handle them very carefully. The following measures are generally sufficient to protect your equipment from ESD.

Precautions

- Use a grounded wrist strap designed to prevent static discharge.
- Touch a grounded metal object before removing any board from its antistatic bag.
- Handle a board by its edges only; do not touch its components, peripheral chips, memory modules or gold contacts.
- When handling chips or modules, avoid touching their pins.
- Put the motherboard, add-on cards and peripherals back into their antistatic bags when not in use.
- For grounding purposes, make sure your computer chassis provides excellent conductivity between the power supply, the case, the mounting fasteners and the motherboard.

Unpacking

The motherboard is shipped in antistatic packaging to avoid static damage. When unpacking the board, make sure the person handling it is static protected.

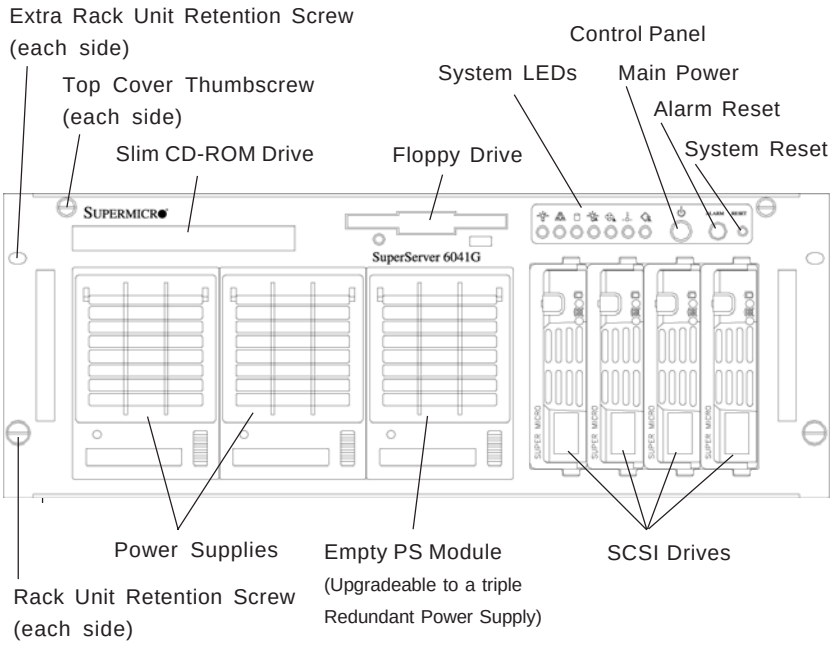


Figure 6-1. Chassis Front View

6-2 Control Panel

The control panel (located on the front of the chassis) must be connected to the JF1 connector on the motherboard to provide you with system status and alarm indications. A ribbon cable has bundled these wires together to simplify the connection. Connect the cable from JF1 on the motherboard (making sure the red wire plugs into pin 1) to JP9 on the Control Panel PCB (printed circuit board). Pull all excess cabling out of the airflow path. The LEDs inform you of system status. See Chapter 3 (System Interface) for details on the LEDs and the control panel buttons. Figure 6-2 shows the connections, jumpers and indicators located on the control panel PCB. Details on JF1 can be found in the Chapter 5 (Advanced Motherboard Installation).

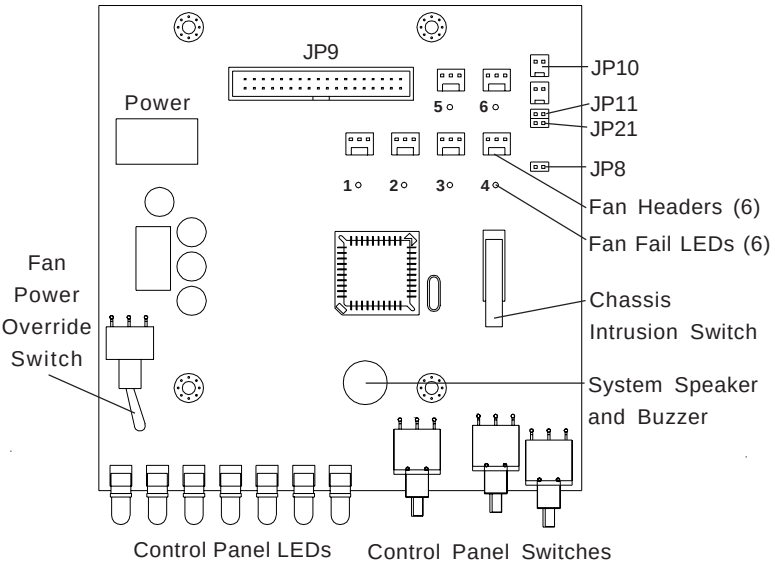


Figure 6-2. Control Panel PCB

Fan Headers: (Fan designations are provided on the PCB)
FAN1 cools the I/O section of the chassis
FAN2 cools the AGP Pro and memory areas
FAN3 directs cooling air to Processors
FAN4 directs cooling air to the system and the Drive Bays
FAN5 is the exhaust fan (FAN5 is on the right when viewed from the rear)

Fan LEDs: The red LEDs by each fan header turn on when the fan it corresponds to has failed.

Jumpers:
JP8 can be jumped to reset the microcontroller on the PCB.
JP11 can be jumped to lock the keyboard.
JP21 disables the power fail alarm if only two power supplies are used.

Headers:
JP10 connects to the SCA backplane to sense for overheating.

Fan Power Override Switch: Turn this switch ON to manually supply power to the system fans. The default setting for this switch is OFF. The system cooling fans normally run at 80% of their maximum RPM to allow for this backup compensation and promote fan life. Turning the fan power override switch to ON overrides the 80% RPM feature to make all fans run at their 100% RPM rate. The microcontroller will continue to monitor for any fan failure when this switch is turned on. You should do this if you want to supply maximum cooling to the system or if the microcontroller malfunctions.

6-3 System Fans

Four 9-cm hot-swap system cooling fans provide are located side by side between the motherboard bay and the front section of the chassis. There are also one 9-cm exhaust fan, which are located at the back of the chassis to pull the cool intake air through the system and force the hot air out.

System Fan Failure

Under normal operation, all six system fans run at 80% of their maximum speed, which supplies sufficient airflow while prolonging fan life. If any fan fails, the rest will automatically increase their RPM to a full 100% to compensate. An audible alarm and an LED on the control panel will notify you of any fan failure. You can disable the alarm with the alarm button on the control panel. The system cooling fans are hot-swap components, which allows you to replace them without powering down the system.

Identifying the failed fan

To determine which fan has failed, first remove the top chassis cover. You can then check the fan fail LEDs on the control panel's printed circuit board (PCB), which can be viewed through a cutout on its protective metal cover. See the designation written by the red illuminated LED on the PCB to determine which fan has failed (Figure 6-2). After determining whether it is a cooling or an exhaust fan and the number (position), you should refer to the following two sections for replacement.

Replacing System Cooling Fans

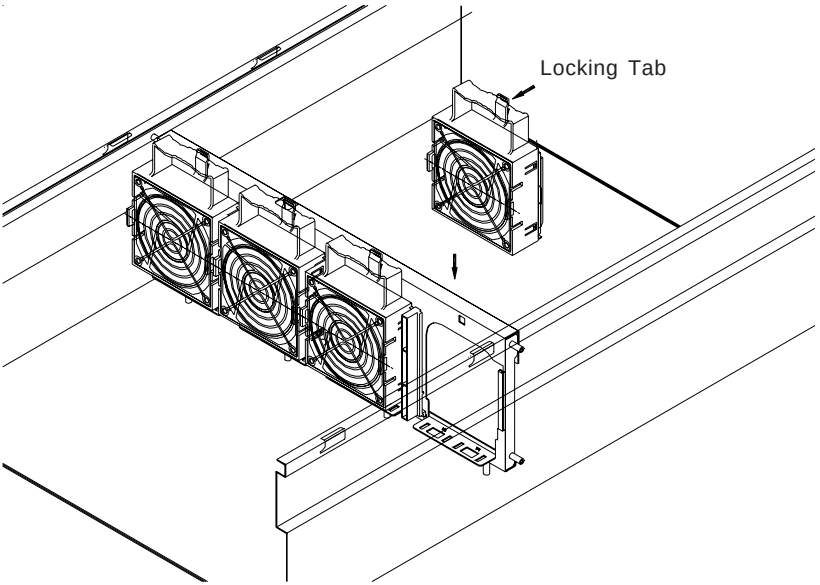
Removing a system cooling fan

With the chassis cover removed, first unplug the fan cable corresponding to the failed fan. Then remove the fan unit from the chassis by depressing the locking tab on the fan housing and pulling the unit straight up (see Figure 6-3). Take apart the fan housing to remove the fan from inside.

Installing a new system cooling fan

Replace the failed fan with an identical 9-cm, 12 volt fan (available from Supermicro). After the new fan has been installed, reassemble the fan housing and plug it back into its slot. You should hear it click into place when fully inserted. Then plug the fan cable back into the same header on the circuit board you removed it from. You should then wind the excess cable around the tabs on the fan housing to keep it out of the way. Check that the fan is working properly and that all the LEDs on the control panel circuit board (Figure 6-2) and the control panel have turned off. Finish by replacing the top panel of the chassis.

Figure 6-3. System Cooling Fan Removal



Replacing System Exhaust Fans

Removing a hot-plug fan housing

With the chassis cover removed, first unplug the fan cable corresponding to the failed fan. Next, push down on the locking tabs at the top and bottom of the fan housing, which protrude through the back end of the chassis. This will detach the housing from the chassis. Reach inside the chassis and pull the housing out of its hole in the chassis. Unscrew the four screws that hold the fan in the housing to remove the bad fan.

Installing a new system exhaust fan

Replace the failed fan with an identical 9-cm, 12 volt fan (available from Supermicro). After the new fan has been installed, reassemble the fan housing. To put it back in the chassis, first insert the bottom fan housing tab into its hole, then swing the top of the fan toward the chassis, pushing down on the top fan housing tab to to insert it into the corresponding hole in the chassis. You should hear it click into place when fully inserted. Finish by plugging the fan cable back into the same power connector you removed it from. Check that the fan is working properly and that the LEDs on the control panel circuit board (Figure 6-2) and the control panel have turned off. Finish by replacing the top panel of the chassis.

6-4 Drive Bay Installation/Removal

Accessing the Drive Bays

SCSI Drives: You do not need to access the inside of the chassis to replace or swap SCSI drives. Proceed to the next step for instructions.
Note: You must use standard 1" high, 80-pin SCA SCSI drives in the SuperServer 6041G.

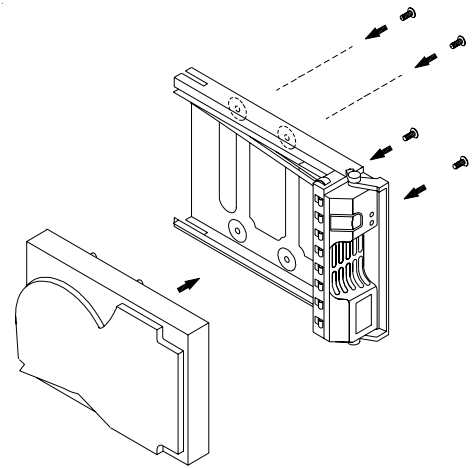
CD-ROM/Floppy Disk Drive: For installing/removing the CD-ROM or floppy disk drive, you will need to gain access to the inside of the chassis by removing the top cover. Proceed to the "CD-ROM and Floppy Drive Installation" section later in this chapter for instructions.
Note: Only a "slim" CD-ROM drive will fit in the 840 chassis.

SCSI Drive Installation

Mounting a SCSI drive in a drive carrier

The SCSI drives are mounted in drive carriers to simplify their installation and removal from the chassis. These carriers also help promote proper airflow for the SCSI drive bays. For this reason, even empty carriers without SCSI drives installed must remain in the chassis. To add a new SCSI drive, install a drive into the carrier with the printed circuit board side toward the carrier so that the mounting holes align with those in the carrier. Secure the drive to the carrier with four screws, as shown in Figure 6-4.

Figure 6-4. Mounting a SCSI Drive in a Carrier



Use caution when working around the SCSI backplane. Do not touch the backplane with any metal objects and make sure no ribbon cables touch the backplane or obstruct the holes, which aid in proper airflow.

<u>Important:</u> Regardless of how many SCSI hard drives are installed, both SCSI drive carriers must remain in the drive bays for proper airflow.

Installing/removing hot-swap SCSI drives

Four SCSI drive bays are located in the front of the chassis, making them easily accessible to install and remove. The SCSI drives can be removed and installed without powering down the system (hot-swap). To remove, first push the release button located beside the drive LEDs, then swing the burgundy colored handle fully out and use it to pull the unit straight out (see Figure 6-5). **Note: Your Operating System must have RAID support to enable the hot-plug capability of the SCSI drives.**

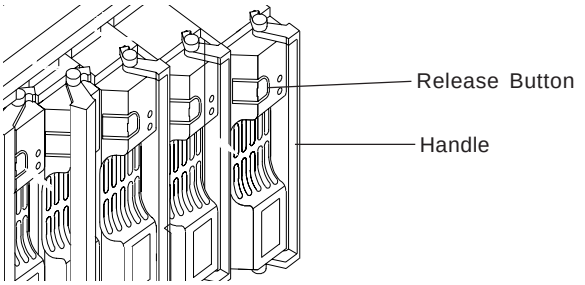
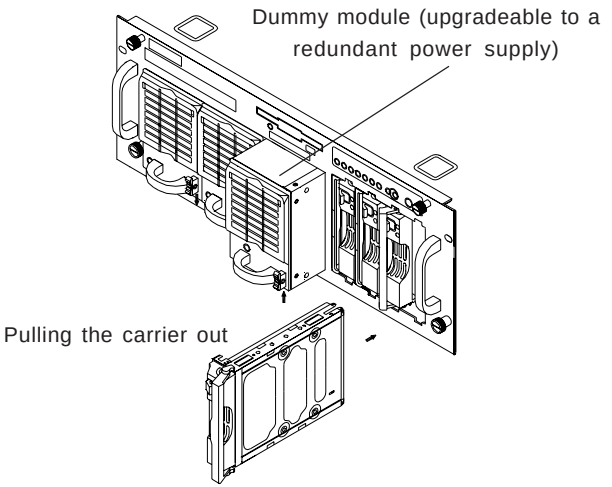


Figure 6-5. Removing SCSI Drives



Important: Regardless of how many SCSI hard drives are installed, all 4 SCSI drive carriers must remain in the drive bays to maintain proper airflow.

SCSI Power Cables

SCSI power cables should be routed in such a way that they do not block the airflow through the chassis. There is a 4-pin connector for the power cables. Connect the connector to the SCA SCSI backplane as noted in Step 3 ("Configuring the hot-plug SCSI drives").

SCA Backplane

The SCSI drives plug into a SAF-TE compliant SCA backplane that provides power and bus termination. A RAID controller can be used with the SCA backplane to provide data security. The operating system you use must have RAID support to enable the hot-swap capability of the SCSI drives. All the jumpers on the SCA backplane are preset and should not be changed. See Figure 6-6.

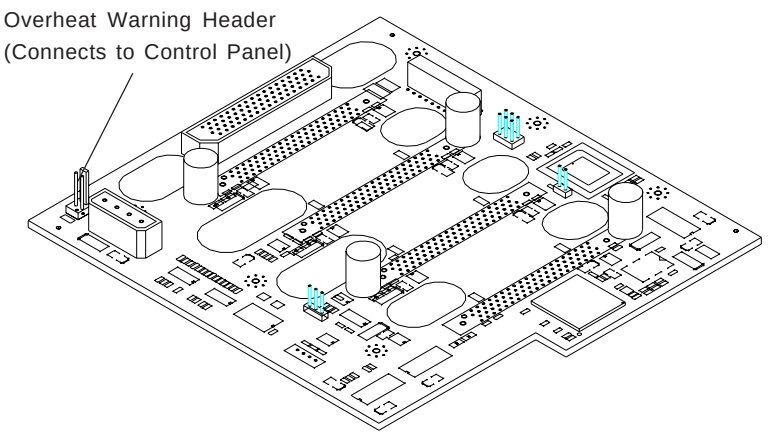


Figure 6-6. SCA Backplane

Use caution when working around the SCA backplane. Do not touch the backplane with any metal objects and make sure no ribbon cables touch the backplane or obstruct the holes, which aid in proper airflow.

CD-ROM and Floppy Drive Installation

The top cover of the chassis must be opened to gain full access to the CD-ROM and floppy drive bays. The CD-ROM drive must have a "slim" profile to fit into the 6041G.

First, release the two retention screws that secure the unit to the rack. Next, release the two screws that secure the top cover to the chassis. Grasp the two handles on either side and pull the unit straight out. There are two square recesses in the top cover to help you push the cover away from you until it stops. You can then remove the top cover from the chassis. You must power down the system before installing or removing floppy or IDE drives.

Drives mount on rails and should "click" into place to be correctly and fully installed in their bays. You should keep the metal shields in place on any unused drives to reduce EMI and noise and to facilitate the airflow inside the chassis.

- The floppy disk drive cable has seven twisted wires.
- A red mark on a wire typically designates the location of pin 1.
- A single floppy disk drive ribbon cable has 34 wires and two connectors to provide for two floppy disk drives. The connector with twisted wires always connects to drive A, and the connector that does not have twisted wires always connects to drive B.

6-5 Power Supply Units

The standard power setup for the SC840 consists of two separate 300 watt power supply units and one empty power bay. Both units provide a continuous 300 watts of power to the system. Addtional power will automatically engage if more power is needed (up to 600W total). Due to the hot-plug redundency, if one powe unit fails, the other unit(s) takes over the load without powering down the system. A third power supply may be added to the empty bay, in which case the system will be provided with 600 watts of power and still have a 300 watt backup. The power supply units have an auto-switching that can automatically sense and operate at any voltage within the range of 110 to 220 volts input.

Power Supply Failure

If any one of the active power units fails or the system requires more than 300W power, the backup unit will automatically power up and enable the system to continue operating without interruption. An audible alarm will notify you of a power unit failure, which you can disable by pressing the alarm button on the control panel. The PWR Fail LED will also illuminate and remain on until the failed unit has been replaced.

Replacing Power Units

1. Identify the failed power unit

The power unit with the illuminated red LED indicates it has failed and should be replaced as soon as possible. Or, if the LED is neither red or green, check to make sure all power cables are all fully plugged into the back of the chassis. If they are, the power unit is probably bad.

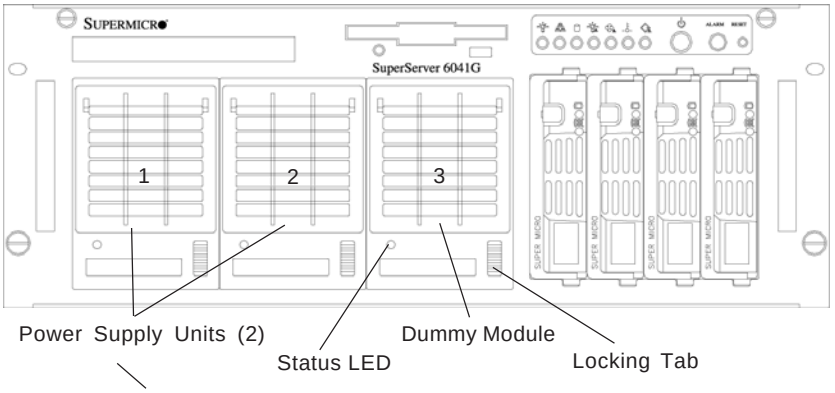
2. Remove the (hot-plug) power unit (See Figure 6-7)

You do not need to power down the system to replace a failed power unit. To remove the failed power unit, push the locking tab on the failed unit up, then grasp the handle and pull the unit completely out. You don't need to unplug the power cable from the back of the chassis.

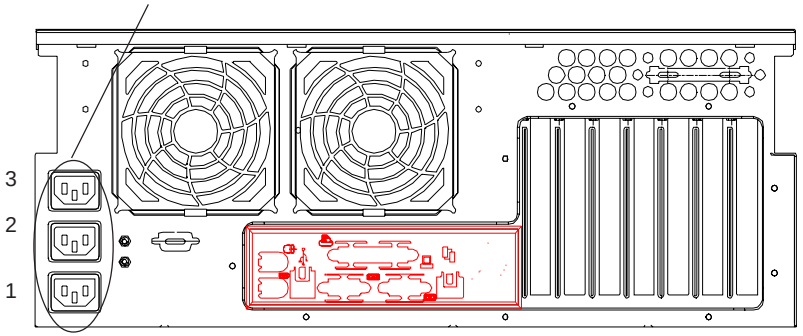
3. Install a new (hot-plug) power unit

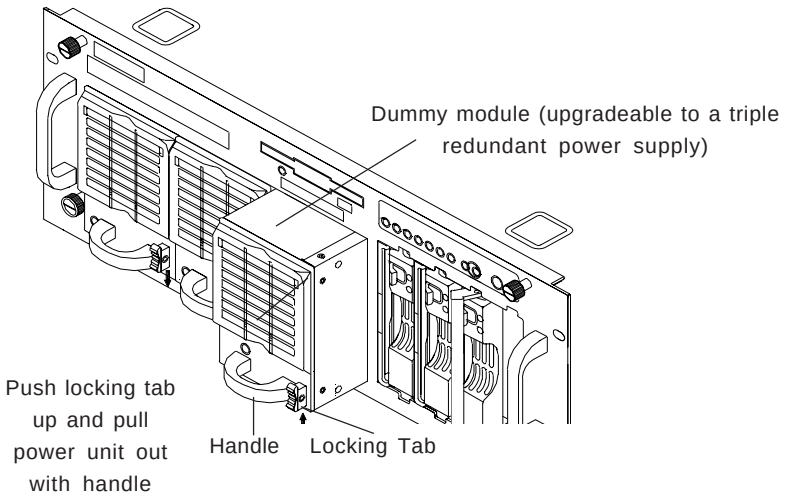
Replace the failed unit with another unit of the same wattage. It is highly recommended that both power units are exactly the same. Gently but firmly push the new unit all the way into the open bay. Secure it by pushing the locking tab downward. The green LED on the power supply unit should illuminate to show that it has power and is operational.

Figure 6-7. Power Supplies



The power supply modules correspond with the AC power marked 1,2,3 below





Chapter 7
BIOS

7-1 Introduction

This chapter describes the AMIBIOS for the P3TDE6. The AMI ROM BIOS is stored in a Flash EEPROM and can be easily upgraded using a floppy disk-based program.

Note: Due to periodic changes to BIOS, some settings may have been added or deleted and might not yet be recorded in this manual. Refer to the Manual Download area of our web site for any changes to BIOS that are not reflected in this manual.

System BIOS

The BIOS is the Basic Input Output System used in all IBM® PC, XT™, AT®, and PS/2® compatible computers. The BIOS ROM stores the system parameters, such as amount of memory, type of disk drives and video displays, etc. BIOS ROM requires very little power. When the computer is turned off, a back-up battery provides power to the BIOS ROM, enabling it to retain the system parameters. Each time the computer is powered-on, the computer is then configured with the values stored in the BIOS ROM by the system BIOS, which gains control when the computer is powered on.

How To Change the Configuration Data

The configuration data that determines the system parameters may be changed by entering the BIOS Setup utility. This Setup utility can be accessed by pressing <Del> at the appropriate time during system boot.

Starting the Setup Utility

Normally, the only visible POST (Power On Self Test) routine is the memory test. As the memory is being tested, press the <Delete> key to enter the main menu of the BIOS Setup utility. From the main menu, you can access the other setup screens, such as the Chipset and Power menus. Section 4-3 gives detailed descriptions of each parameter setting in the Setup utility.

An AMIBIOS identification string is displayed at the left bottom corner of the screen, below the copyright message.

7-2 BIOS Features

- Supports Plug and Play V1.0A and DMI 2.3
- Supports Intel PCI (Peripheral Component Interconnect) (PME) local bus specification 2.2
- Supports Advanced Power Management (APM) specification v 1.1
- Supports ACPI
- Supports Flash ROM

AMIBIOS supports the LS120 drive made by Matsushita-Kotobuki Electronics Industries Ltd. The LS120:

- Can be used as a boot device
- Is accessible as the next available floppy drive

AMIBIOS supports PC Health Monitoring chips. When a failure occurs in a monitored activity, AMIBIOS can sound an alarm and display a message. The PC Health Monitoring chips monitor:

- CPU temperature
- Chassis intrusion detector
- Five positive voltage inputs
- Four fan speed monitor inputs

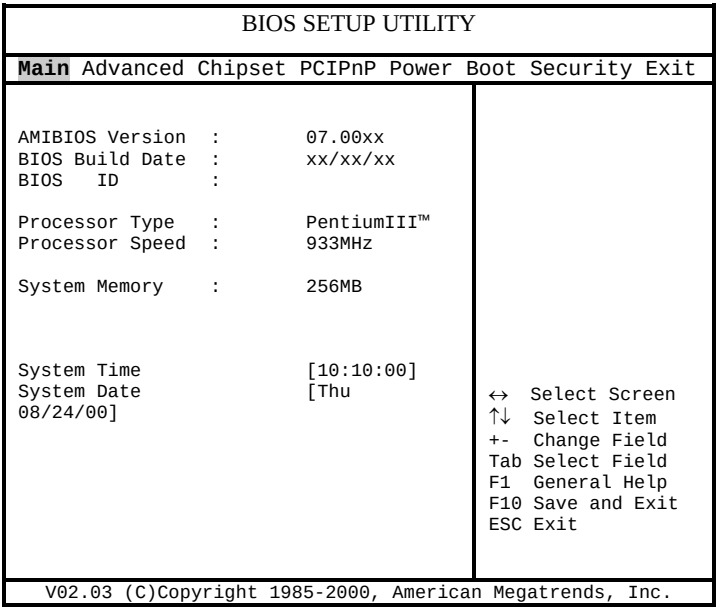
7-3 Running Setup

**Optimal default settings are in bold text unless otherwise noted.*

The BIOS setup options described in this section are selected by choosing the appropriate text from the Standard Setup screen. All displayed text is described in this section, although the screen display is often all you need to understand how to set the options (see on next page).

The Main BIOS Setup Menu

Press the <Delete> key during the POST (Power On Self Test) to enter the Main Menu of the BIOS Setup Utility. All Main Setup options are described in this section. The Main BIOS Setup screeen is displayed below.



Use the Up/Down arrow keys or the <Tab> key to move between the different settings in the above menu.

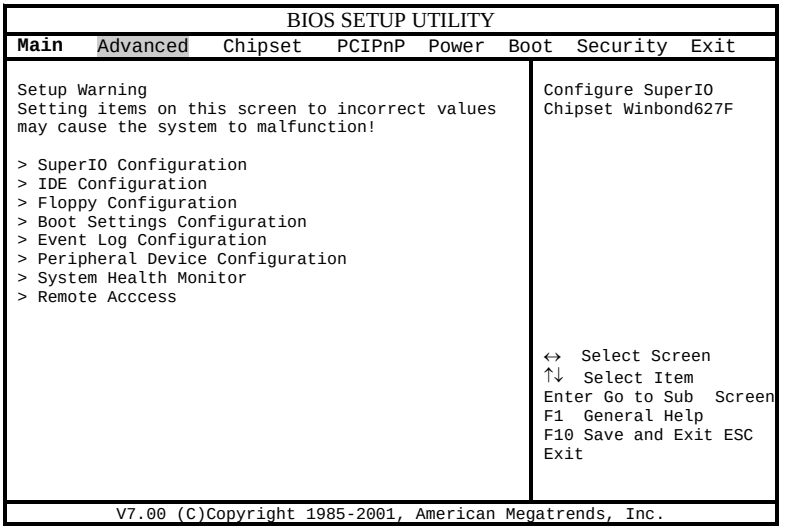
When the items "System Time", and "System Date" are highlighted, type in the correct time/date in the time field, and then press "Enter". The date must be entered in MM/DD/YY format. The time is entered in HH:MM:SS format. The time is in also 24-hour format. For example, 5:30 a.m. appears as 05:30:00 and 5:30 p.m. as 17:30:00.

Press the <ESC> key to exit the Main Menu and use the Left/Right arrow keys to enter the the other categories of BIOS settings. The next section is described in detail to illustrate how to navigate through the menus.

Note: Items displayed in gray are preset and cannot be selected. Items with a blue arrow are commands, not options (i.e. Discard Changes).

7-4 Advanced BIOS Setup

Choose Advanced BIOS Setup from the AMIBIOS Setup Utility main menu with the Left/Right arrow keys. You should see the following display. Select one of the items in the left frame of the screen, such as SuperIO Configuration, to go to the sub screen for that item. Advanced BIOS Setup options are displayed by highlighting the option using the arrow keys. All Advanced BIOS Setup options are described in this section.

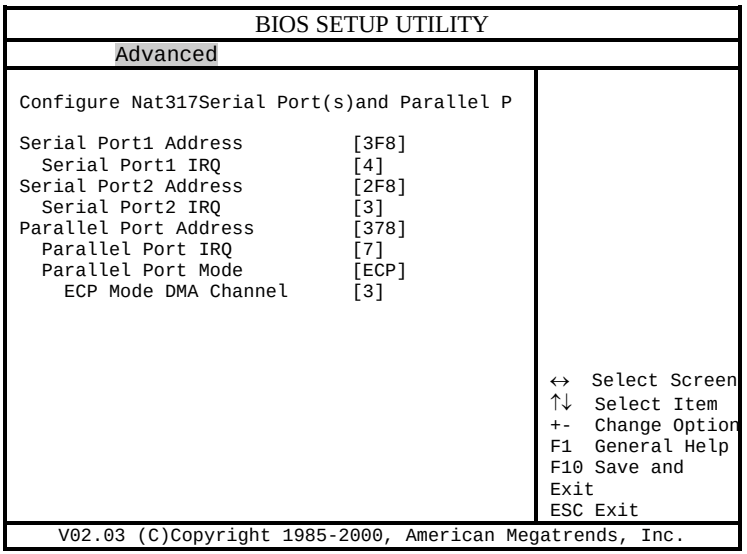


Use the Up/Down arrow keys to select the "Super I/O Configuration line.

When the "Super IO Configuration" line is highlighted, hit "ENTER" to display its menu.

The following Super IO Configuration screen will appear. Here you can select your options for the your computer's I/O (Input/Output) devices.

Super I/O Configuration



The Super IO Configuration includes the following items:

Serial Port 1 Address

This option specifies the base I/O port address of serial port 1. The settings for this item include Disabled, **3F8** and 3E8 and 2E8. Select the desired setting and then press "Enter".

Serial Port 1 IRQ

This option specifies the Interrupt Request address of serial port 1. The settings for this item include Disabled, **4** and 3.

Serial Port 2 Address

This option specifies the base I/O port address of serial port 2. The settings for this item include Disabled, **2F8**, 3E8 and 2E8.

Serial Port 2 IRQ

This option specifies the Interrupt Request address of serial port 2. The settings for this item include Disabled, 4 and **3**.

Parallel Port Address

This option specifies the I/O address used by the parallel port. The settings for this item include Disabled, **378**, 278 and 3BC. Select your setting and then press "Enter".

Parallel Port IRQ

This option allows the user to set the Parallel Port IRQ. The settings for this item include 5 and **7**.

Parallel Port Mode

This option specifies the parallel port mode. The settings for this item include Normal, Bi-directional, EPP and **ECP**.

ECP Mode DMA Channel

This option allows the user to set the setting for the ECP Mode of the DMA Channel. The settings for this item include **0**, 1 and 3.

IDE Configuration

Onboard PCI IDE Controller

This option allows the user to enable or disable the integrated IDE Controller. The settings include Disabled, Primary, Second and **Both**. Select "Disabled" to disable the Integrated IDE Controller. Select "Primary" to enable the Primary IDE ontroller only. Select "Secondary" to enable the Secondary IDE Controller only. Select "Both" to enable both Primary and Secondary IDE Controllers.

Primary IDE Master

When entering "Setup", BIOS automatically detects the presence of IDE devices. This displays the auto detection status of the IDE devices. You can also manually configure the IDE drives by providing the following information:

This option allows the user to configure the IDE devices. When the desired item is highlighted (selected), press "Enter" and the following screen will be displayed:

Type

This option sets the type of device that the AMIBIOS attempts to boot from after AMIBIOS POST is completed. The settings include Not installed, **Auto**, CDROM and ARMD. The "Auto" setting allows BIOS to automatically detect the presence of the IDE controller.

LBA/Large Mode

LBA (Logical Block Addressing) is a method of addressing data on a disk drive. In LBA mode, the maximum drive capacity is 137 GB. The settings are Disabled and **Auto**. Select "Disabled" to disable LBA mode. Select "Auto" to enable LBA mode if your device supports it and is not already formatted with the LBA mode.

Block (Multi-Sector Transfer) Mode

This option sets the block mode multi sector transfers option The settings include Disabled and **Auto**. Disabled: This option prevents the BIOS from using Multi-Sector Transfer on the specified channel. The data to and from the device will occur one sector at a time. Auto: This option allows the BIOS to auto detect device support for Multi-Sector Transfers on the specified channel. If supported, this option allows the BIOS to auto detect the number of sectors per block for transfer from the hard disk drive to memory. The data transfer to and from the device will occur multiple sectors at a time (if the device supports it).

PIO Mode

IDE PIO (Programmable I/O) mode programs timing cycles be tween the IDE drive and the programmable IDE controller. As the PIO mode increases, the cycle time decreases. The settings are: **Auto**, 0, 1, 2, 3 and 4.

DMA Mode

This item allows the users to select the DMA mode. The settings are: **Auto**, SWDMA0, SWDMA1, SWDMA2, MWDMA0, MWDMA1, MWDM2, UWDMA0, UWDMA1, UWDMA2, UWDMA3 and UWDMA4. Select Auto to auto detect the DMA Mode. Select SWDMA0 through SWDMA2 to set single word DMA0 through DMA2. Select MWDMA0 through MWDMA2 to set Multi-word DMA0 through DMA2. Select UDMA0 trhough UDMA4 to set Ultra DMA0 through Ultra DMA4.

S.M.A.R.T.

S.M.A.R.T stands for Self-Monitoring Analysis and Reporting Technology, a feature that can help predict impending drive failures. The settings are **Auto**, Disabled and Enabled. Select "Enabled" or "Disabled" to enable or disable the S.M.A.R.T. Select "Auto" to auto detect S.M.A.R.T.

32Bit Data Transfer

The settings are Auto, Disabled and **Enabled**. Select "Enabled" or "Disabled" to enable or disable the 32-bit Data Transfer function. Select "Auto" to auto detect the 32-bit Data Transfer function.

ARMD Emulation Type

This option is used to select the emulation used when config uring an LS120, MO (Magneto-Optical), or Iomega Zip drive. The settings are **Auto**, Floppy and HardDisk.

Primary IDE Slave

When the system enters "Setup", BIOS automatically detects the presence of IDE devices. This option displays the auto detection status of IDE devices. The settings for "Primary IDE Slave" are the same as those for the "Primary IDE Master".

Secondary IDE Master

This displays the status of auto detection of IDE devices. The settings for "Secondary IDE Master" are the same as those for the "Primary IDE Master".

Secondary IDE Slave

This displays the status of auto detection of IDE devices. The settings for "Secondary IDE Slave" are the same as those for the "Primary IDE Master".

Hard Disk Write Protect

This item allows the user to prevent the hard disk from being overwritten. The options are Enabled or **Disabled**. Enabled allows the drive to be used normally; read, write and erase functions can all be performed. Disabled prevents the hard disk from being erased. This function is effective only when the device is accessed through BIOS.

ATA(PI) Detect Timeout (Second)

Set this option to stop the system search for ATAPI devices within the specified number of seconds. The options are 0, 5, 10, 15, 20, 25, 30, and **35** (seconds). Most ATA disk drives can be detected within 5 seconds.

Floppy Configuration

Floppy A

Use this option to specify which of floppy drive you have installed in the A drive. The settings are Disabled, 360 KB 5 1/4", 1.2 MB 5 1/4", 720 KB 3 1/2", **1.44 MB 3 1/2"** and 2.88 MB 3 1/2".

Floppy B

Use this option to specify which of floppy drive you have installed in the B drive. The settings are Disabled, 360 KB 5 1/4", 1.2 MB 5 1/4", 720 KB 3 1/2", **1.44 MB 3 1/2"** and 2.88 MB 3 1/2".

Diskette Write Protect

This option allows you to prevent any writing to your floppy diskette. The settings are **Disabled,** 360 KB 5 1/4", 1.2 MB 5 1/4", 720 KB 3 1/2", **1.44 MB 3 1/2"** and 2.88 MB 3 1/2". The Enabled setting is effective only if the device is accessed through BIOS.

Floppy Drive Seek

Use this option to Enable or **Disable** the floppy seek routine on bootup.

Boot Settings Configuration

Quick Boot

This option allows the BIOS to skip certain tests that are normally perfomred on boot up. You can disable the option to speed up boot time. The settings are **Disabled** and Enabled.

Quiet Boot

If Disabled, this option will cause the normal POST messages to be displayed upon setup. When Enabled, the OEM logo is displayed instead of the POST messages. The settings are Enabled, and **Disabled**.

Add-On ROM Display Mode

Set this option to display add-on ROM (read-only memory) messages. The settings for this option are **Force BIOS** and Keep Current. Force BIOS

allows the computer to force a third party BIOS to display during system boot. Keep Current has the system display AMIBIOS information on bootup.

BootUp Num Lock

This option is used to select the status of the Number Lock function on your keyboard on bootup. The settings are **On** and Off.

BootUp CPU Speed

This option is used set the CPU speed to either **High** or Low.

PS/2 Mouse Support

This option specifies whether a PS/2 Mouse will be supported. Settings are **Enabled** and Disabled.

Typematic Rate

Set this option to select the rate at which the computer repeats a key that is held down. Settings are **Fast** and Slow. Fast: This sets the rate the computer repeats a key to over 20 times per second. Under normal operations, this setting should not be changed. Slow: This sets the rate the computer repeats a key to under 8 times per second.

System Keyboard

This option is to let the system know if a keyboard is **Present** or Absent.

Primary Display

This option specifies the type of monitor display you have installed on the system. The settings are Absent, **VGA/EGA**, Color 40 x 25, Color 80 x 25 and monochrome.

Parity Check

Use this option to either Enable or **Disable** the use of memory parity checking.

Boot to OS/2

This option can be used to boot the system to an OS/2 operating system. The settings are **No** and Yes.

Wait for F1 if Error

This settings for this option are **Enabled** and Disabled. Disabled: This prevents the AMIBIOS to wait on an error for user intervention. This setting should be used if there is a known reason for a BIOS error to appear. An example would be a system administrator must remote boot the system. The computer system does not have a keyboard currently attached. If this setting is set, the system will continue to bootup in to the operating system. If 'F1' is enabled, the system will wait until the BIOS setup is entered. Enabled: This option allows the system BIOS to wait for any error. If an error is detected, pressing <F1> will enter Setup and the BIOS setting can be adjusted to fix the problem. This normally happens when upgrading the hardware and not setting the BIOS to recognize it.

Hit "Delete" Message Display

This option tells the system to display or not display the "Hit Delete to Enter Setup" message. The settings are **Enabled** and Disabled.

Processor Serial Number

This option allows the operating system and applications to be able to read the CPU serial number from your CPUs. The settings are Enabled and **Disabled.** (*Note: This option is not available for Intel Celeron Processors because these processors do not contain a processor serial number.)

Internal Cache

This option is for enabling or disabling the internal CPU L1 cache. Settings include Disabled, Write-Thru, **Write-Back** and Reserved. Disabled: This option prevents the system from using the internal CPU L1 cache. This setting should be used to slow the computer system down or to troubleshoot error messages. Write-Thru: This option allows the computer system to use the internal CPU L1 cache as Write-Though cache. Write-Through cache is slower than Write-Back cache. It performs write operations to the internal L1 CPU cache and system memory simultaneously. Write-Back:
This option allows the computer system to use the internal CPU L1 cache as Write-Back cache. Write-Back cache is faster than Write-Through cache. Write-Back cache is a caching method in which modifications to data in the cache aren't copied to the cache source until absolutely necessary. Write-back caching is available on all CPUs supported by this BIOS. With these

CPUs, write operations stored in the L1 cache aren't copied to main memory until absolutely necessary. This is the default setting.

System BIOS Cacheable

This option enables you to move the system BIOS to the memory cache to improve performance. Settings are **Enabled** and Disabled.

Event Log Configuration

Event Logging

This option **Enables** or Disables the logging of events. You can use this screen to select options for the Event Log Configuration Settings. You can access sub screens to view the event log and mark all events as read. Use the up and down arrow keys to select an item, and the plus (+) and minus (-) keys to change the option setting. The settings are described on the following pages. The screen is shown below.

ECC Event Logging

This option Enables or **Disables** the logging of ECC events. The events logged by AMIBIOS are post errors such as a bad BIOS, floppy errors, or hard drive errors.

Clear All Event Logs

This option can be used to tell the system to clear the event log on the next boot up. The settings are **No** and Yes.

View Event Log

Highlighting this and pressing <Enter> will allow you to view the unread events from the event log area.

Mark All Events As Read

Highlighting [OK] and pressing <Enter> will mark all events in the log area as having been read. The settings are OK and **Cancel**.

Peripheral Device Configuration

Onboard SCSI

This option allows you to **Enable** or Disable the onboard SCSI.

Power Lost Control

This option determines how the system will respond when power is reapplied after a power loss condition. Choose **Always On** to automatically start up the system when power is reapplied. Always Off means you must push the main power button to restart the system after power is restored.

System Health Monitor

The BIOS continuously monitors the health of your system by measuring certain voltage levels and temperatures.

CPU1 Current Temperature/CPU2 Current Temperature
This reading displays the real-time temperatures of CPU1 and CPU2.

System Overheat Warning

This option allows you to **Enable** or Disable a system overheat warning signal, used to notify you in the event of a dangerous rise in heat levels.

Overheat Warning Temperature

This option allows you to specify the temperature threshold that, when exceeded, will trigger the overheat warning alarm.

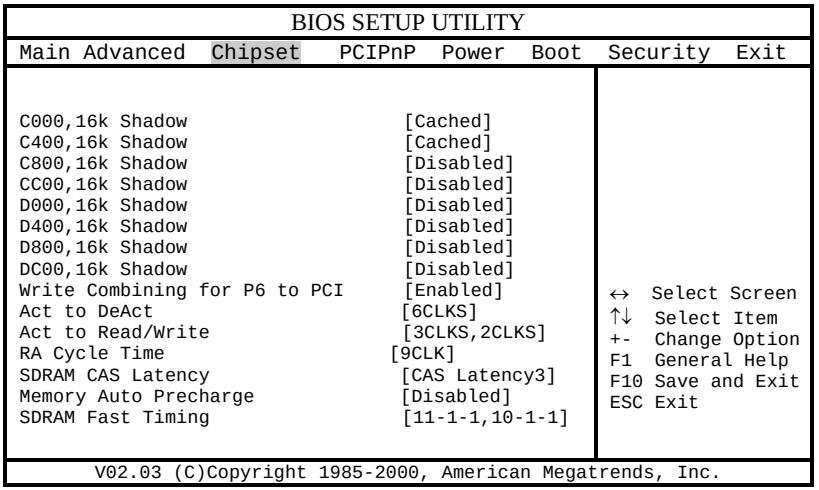
The rest of the System Health Monitor menu lists various voltages and temperatures as they are currently being measured. These include CPU temperature, CPU voltage, the rpms of the CPU, chassis and thermal control fans as well as various other voltages.

Remote Access Configuration

This option allows the user to redirect the console (display) through the COM port when enabled. This is useful when two computers are hooked up to a single monitor. When enabled, the user can toggle the display from one system to the other using the <Tab> key. The function keys are diabled when this setting is enabled. The settings are "Serial Ansi" and "**Disabled**."

7-5 Chipset Setup

Choose Chipset Setup from the AMIBIOS Setup Utility main menu. The screen is shown below. All Chipset Setup options are described following the screen.



C000, 16k Shadow

C400, 16k Shadow

C800, 16k Shadow

CC00, 16k Shadow

D000, 16k Shadow

D400, 16k Shadow

D800, 16k Shadow

DC00, 16k Shadow

These options specify how the 16 KB of video ROM at each of the above addresses is treated. When Disabled, the contents of the video ROM are not copied to RAM. When Enabled, the contents of 16 KB of video ROM beginning at the above address are copied (shadowed) from ROM to RAM

for faster application. The settings for this option are Disabled and Enabled. (The optimal settings are **Cached** for C000, C400, C800 anc CC00 and **Disabled** for all the other addresses.

Write Combining for P6-to-PCI

This settings for this option are Disabled and **Enabled**. Select "Enabled" to enable the function of Write Combining for P6-to-PCI.

Act to Deact

This settings for this option are **6 CLKS** and 5 CLKS.

Act to Read/Write

This settings for this option are **3 CLKS** and 2 CLKS.

RAS Precharge Time

This option defines the RAS precharge time. Settings are **3 CLKS** and 2 CLKS.

RAS Cycle Time

This option defines the RAS cycle time. Settings include 10 CLKS, **9 CLKS,** 8 CLKS and 7 CLKS.

SDRAM CAS Latency

This option defines the SDRAM CAS Latency settings. CAS stands for Column Address Strobe. Settings include **CAS Latency 3** and CAS Latency 2.

Memory Auto Precharge

The settings are **Enabled** and Disabled.

SDRAM Fast Timing

This option defines the Fast timing settings for SDRAM . Settings include 11-1-1 and **10-1-1-1**.

Memory Writing Posting

The settings are **Enabled** and Disabled.

Fast ECC Enable

The settings are Enabled and **Disabled**.

ISA IO Cycle Delay

This settings for this option are FULL Delay, **1.5 BLCK,** 2.5 BLCK and 3.5 BLCK.

Scrubbing Enable

The settings are Enabled and **Disabled.**

AGP Device Address Space Size

This settings for this option are **32MB**, 64MB, 128MB, 256MB and 512MB.

AGP Operations

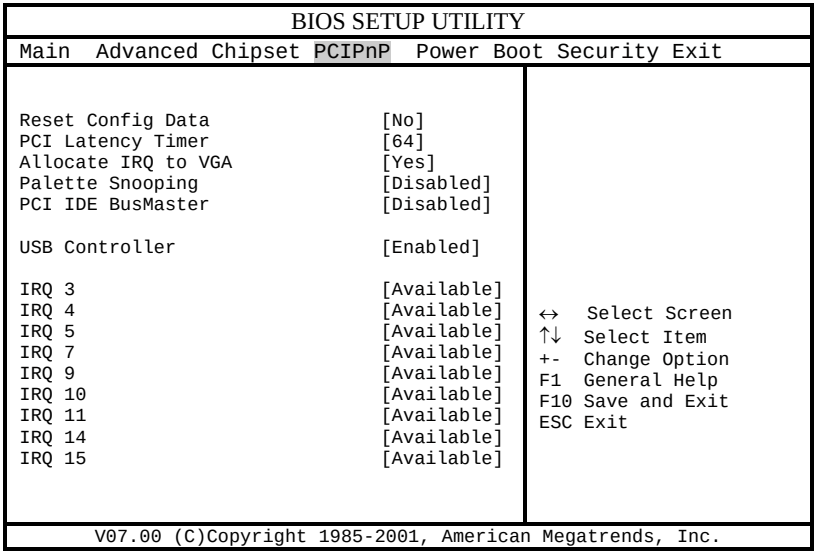
This settings for this option are **Enabled** and Disabled.

MPS 1.4 Support

The settings for this option are **Enabled** and Disabled.

7-6 PCI PnP Setup

Choose PCI/PnP Setup from the AMIBIOS Setup main menu. All PCI/PnP options are described in this section. The PCI/PnP Setup screen is shown below.



Reset Configuration Data

Choosing the Yes setting will cause the PnP configuration data in the BIOS to be cleared on the next boot up. Choosing the **No** setting does not force PnP data to be cleared on the next boot.

PCI Latency Timer

This option specifies the latency timing of the PCI clocks for all PCI devices. Settings include 32, **64**, 96, 128, 160, 192, 224 and 248 PCI clocks.

Allocate IRQ to PCI VGA

This option lets you allocate an interrupt request (IRQ) to the PCI VGA adapter card (if used). The settings are **Yes** and No.

Palette Snooping

When enabled, this option informs PCI devices that an ISA graphics device is installed. The settings are **Disabled** and Enabled. This does not necessarily indicate a physical ISA adapter card. The graphics chipset can be mounted on a PCI card. Always check with your adapter card manuals first, before modifying the default settings in the BIOS.

PCI IDE BusMaster

The settings for this option are **Disabled** and Enabled. Enable to specify that the IDE controller on the PCI bus has bus mastering capabilities.

USB Function

The settings for this option are Disabled and **Enabled**. Disabled prevents the use of the USB ports and Enabled allows the use of the USB ports.

IRQ 3

IRQ 4

IRQ 5

IRQ 7

IRQ 9

IRQ 10

IRQ 11

IRQ 14

IRQ 15

The settings for the above options are **Available** and Reserved. Available allows the specified IRQ to be available for use by PCI/PnP devices. Reserved means the specified IRQ is reserved for use by Legacy ISA devices.

Reserved Memory Size

This option specifies the size of a memory area to be reserved for Legacy ISA adapter cards. The settings are **Disabled**, 16k, 32k and 64k.

7-7 Power Setup

Choose Power Setup from the AMIBIOS Setup main menu. All Power Setup options are described in this section. The Power Setup screen is shown below.

```
                        BIOS SETUP UTILITY
Main  Advanced  Chipset  PCIPnP  Power  Boot  Security  Exit

ACPI Aware O/S                          [Yes]
Power Management                        [Enabled]

Green PC Monitor Power State            [StandBy]
Video Power Down Mode                   [Suspend]
Hard Disk Power Down Mode               [Disabled]
Inactivity Timer                        [Off]
Suspend Timeout (Minutes)               [Off]
IRQ1                                    [Monitor]
IRQ3                                    [Ignore]
IRQ4                                    [Ignore]
IRQ5                                    [Ignore]
IRQ6                                    [Ignore]
IRQ7                                    [Ignore]
IRQ9                                    [Ignore]
IRQ10                                   [Ignore]
IRQ11                                   [Ignore]
IRQ12                                   [Monitor]
IRQ14                                   [Monitor
IRQ15                                   [Ignore]

                                        ↔  Select Screen
                                        ↑↓  Select Item
                                        +-  Change Option
                                        F1  General Help
                                        F10 Save and Exit
                                        ESC Exit

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```

ACPI Aware O/S

This option allows the system to utilize Intel's ACPI (Advanced Configuration and Power Interface) specification. Settings are No and **Yes**. DOS®, Windows 3.x®, and Windows NT® are examples of non-ACPI aware operating systems. Windows 95®, Windows 98®, Windows ME® and Windows 2000® are examples of ACPI aware operating systems.

Power Management

This option allows you to select using APM (Advanced Power Management). The settings are Disabled and **Enabled**.

Green PC Monitor Power State

This option specifies the power state that a green PC-compliant monitor enters when BIOS places it in a power saving state after the specified period of display inactivity has expired. The settings include **Standby**, Suspend and Off.

Video Power Down Mode

This option specifies the power state that the VGA video subsystem enters after the specified period of display inactivity has expired. The settings include Disabled, Standby and **Suspend**.

Inactivity Timer

This option specifies the length of hard disk inactivity time that should expire before entering the power conserving state. The settings include **Off**, 1, 5, 10, 20, 30, 60 and 120 (minutes).

Suspend Timeout

This option specifies if BIOS is to monitor for display activity when in a power saving state. The settings include **Off**, 1, 2, 3, 4, 5, 6, 7, 8, 9 and 10 (minutes).

IRQ1

IRQ3

IRQ4

IRQ5

IRQ6

IRQ7

IRQ9

IRQ10

IRQ11

IRQ12

IRQ14

IRQ15

With the above options, you can monitor each interrupt request and resume the system's normal power up state when activated. Settings are Ignore and Monitor. All IRQs are defaulted to Ignore except for IRQ 1, 12 and 14, whcih default to Monitor.

USB Controller Resume

This allows you to wake up the system from a USB device. The settings for this option **Disabled** and Enabled.

PME Resume

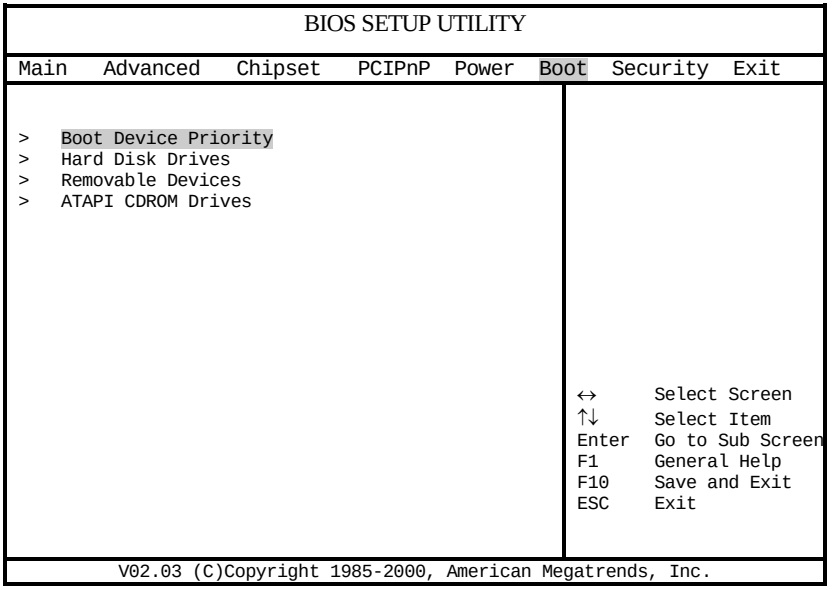
This allows you to wake up the system from a PME device. The settings for this option **Disabled** and Enabled.

RI Resume

This option allows the system to resume the function of Ring Indicator. The settings for this option **Disabled** and Enabled.

7-8 Boot Setup

Choose Boot Setup from the AMIBIOS Setup main menu. All Boot Setup options are described in this section. The Boot Setup screen is shown below.



Boot Device Priority

1st Boot Device

This option is used to specify the order of the boot sequence that will be followed from the available system devices. The settings for the 1st Boot Device are **Removable Device**, ATAPI CDROM, Hard Drive, Intel UNDI PX-2 and Disabled.

2nd Boot Device

The settings for the 2nd Boot Device are Removable Device, **ATAPI CDROM**, Hard Drive, Intel UNDI PX-2 and Disabled.

3rd Boot Device

The settings for the 3rd Boot Device are Removable Device, ATAPI CDROM, **Hard Drive**, Intel UNDI PX-2 and Disabled.

4th Boot Device

The settings for the 3rd Boot Device are Removable Device, ATAPI CDROM, Hard Drive, **Intel UNDI PX-2** and Disabled.

Hard Disk Drives

Use this screen to view the boot sequency of hard drives that have been auto-detected or entered manually on your system.

Removable Devices

Use this screen to view the boot sequency of the removeable devices that have been auto-detected or entered manually on your system.

ATAPI CDROM Drives

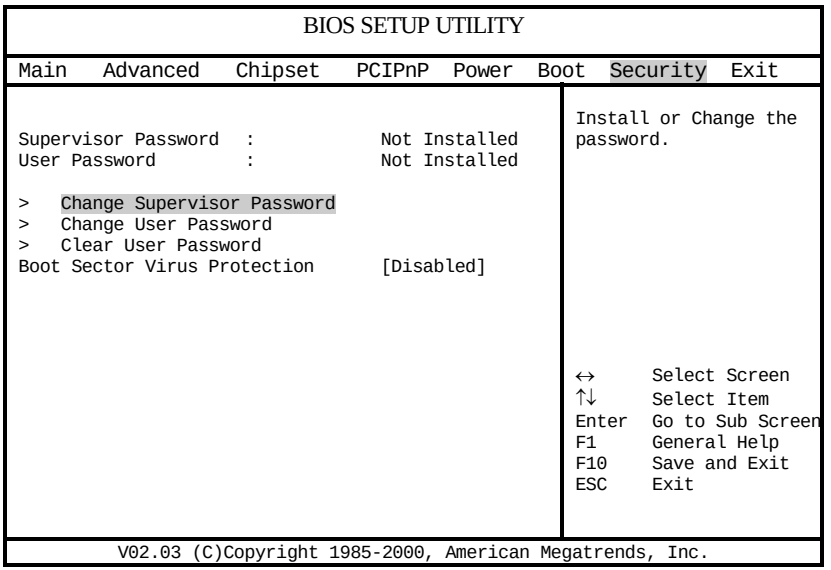
Use this screen to view the boot sequency ofthe ATAPI CDROM drives that have been auto-detected or entered manually on your system.

BBS Support

This option allows you to set the BIOS Boot Specification (BBS). The settings are **Enabled** and Disabled.

7-9 Security Setup

Choose Security Setup from the AMIBIOS Setup main menu. All Security Setup options are described in this section. The Security Setup screen is shown below.



Supervisor Password

User Password

AMIBIOS provides both Supervisor and User password functions. If you use both passwords, the Supervisor password must be set first. The system can be configured so that all users must enter a password every time the system boots or when AMIBIOS Setup is executed, using either or both the Supervisor password or User password. The Supervisor and User passwords activate two different levels of password security. If you select password support, you are prompted for a 1 – 6 character password. Type the password on the keyboard. The password does not appear on the screen when typed. Make sure you write it down. If you forget it, you must clear CMOS and reconfigure. **Remember your Password!** Keep a record of the new password when the password is changed. If you forget the password, you must erase the system configuration information in CMOS.

Change Supervisor Password

This option allows you to change a supervisor password that was entered previously.

Change User Password

This option allows you to change a user password that was entered previously.

Clear User Password

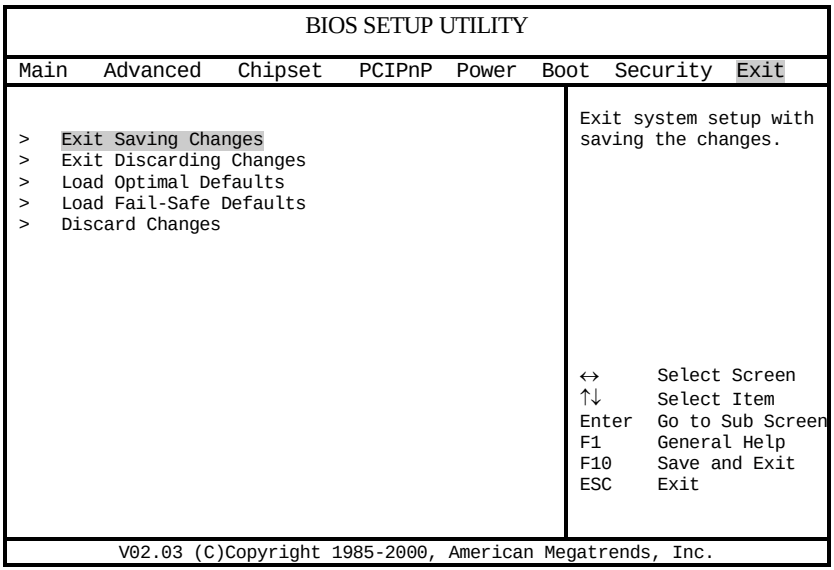
Use this option to clear the user password so that it is not required to be entered when the system boots up.

Boot Sector Virus Protection

This option allows you to enable or disable a virus detection program to protect the boot sector of your hard disk drive. The settings for this option **Disabled** and Enabled. If Enabled, AMIBIOS will display a warning when any program (or virus) issues a Disk Format command or attempts to write to the boot sector of the hard disk drive.

7-10 Exit Setup

Choose Exit Setup from the AMIBIOS Setup main menu. All Exit Setup options are described in this section. The Exit Setup screen is shown below.



Exit Saving Changes

Highlighting this setting and then pressing <Enter> will save any changes you made in the BIOS Setup program and then exit. Your system should then continue with the boot up procedure.

Exit Discarding Changes

Highlighting this setting and then pressing <Enter> will ignore any changes you made in the BIOS Setup program and then exit. Your system should then continue with the boot up procedure.

Load Optimal Defaults

Highlighting this setting and then pressing <Enter> provides the optimum performance settings for all devices and system features.

Load Failsafe Defaults

Highlighting this setting and then pressing <Enter> provides the safest set of parameters for the system. Use them if the system is behaving erratically.

Discard Changes

Highlighting this setting and then pressing <Enter> will ignore any changes you made in the BIOS Setup program but will not exit the BIOS Setup program.

Appendix A
BIOS Error Beep Codes & Messages

During the POST (Power-On Self-Test) routines, which are performed each time the system is powered on, errors may occur.

Non-fatal errors are those which, in most cases, allow the system to continue the boot-up process. The error messages normally appear on the screen.

Fatal errors are those which will not allow the system to continue the boot-up procedure. If a fatal error occurs, you should consult with your system manufacturer for possible repairs.

These fatal errors are usually communicated through a series of audible beeps. The numbers on the fatal error list, on the following page, correspond to the number of beeps for the corresponding error. All errors listed, with the exception of Beep Code 8, are fatal errors.

AMI BIOS Error Beep Codes

Beep Code	Error Message	Description
1 beep	Refresh	***The memory refresh circuitry on the motherboard is faulty***
2 beeps	BIOS ROM file absent	***The BIOS was unable to find the specific file name required to flash the BIOS***
3 beeps	Base 64KB memory failure	***Memory failure occurred in the first 64KB of Memory***
4 beeps	Flash program successful	***The flash was properly programmed with the BIOS ROM file.***
5 beeps	Media read error	***The floppy or ATAPI media is not presented or cannot be read***
6 beeps	Keyboard controller Gate A20 failure	***The keyboard controller may be bad. The BIOS cannot switch to protected mode.***
7 beeps	Processor exception interrupt error	***The CPU generated an exception interrupt***
8 beeps	Display memory read/write error	***The system video adapter is either missing or its memory is faulty. This is not a fatal error.***
10 beeps	Flash erase error	***The flash device was unable to be properly programmed.***
11 beeps	Flash program error	***The flash device was unable to be properly programmed.***
12 beeps	BIOS ROM file incorrect size	***The BIOS ROM file found does not match the size of the flash device***
13 beeps	BIOS ROM image mismatch	***The BIOS ROM file layout configuration does not match image present in the flash device.***
5 short +_1 long beeps	Memory Error	***No memory detected in the system***
6 short + 1 long beeps	Memory Error	***EDO memory detected in system***
7 short + 1 long beeps	SMBUS Error	***SMBUS error***

Appendix B
AMIBIOS POST Checkpoint Codes

When AMIBIOS performs the Power On Self Test, it writes diagnostic codes checkpoint codes to I/O port 0080h. If the computer cannot complete the boot process, diagnostic equipment can be attached to the computer to read I/O port 0080h.

B-1 Uncompressed Initialization Codes

The uncompressed initialization checkpoint codes are listed in order of execution:

Checkpoint	Code Description
D0h	The NMI is disabled. Power on delay is starting. Next, the initialization code checksum will be verified.
D1h	Initializing the DMA controller, performing the keyboard controller BAT test, starting memory refresh, and entering 4 GB flat mode next.
D3h	Starting memory sizing next.
D4h	Returning to real mode. Executing any OEM patches and setting the Stack next.
D5h	Passing control to the uncompressed code in shadow RAM at E000:0000h. The initialization code is copied to segment 0 and control will be transferred to segment 0.
D6h	Control is in segment 0. Next, checking if <Ctrl> <Home> was pressed and verifying the system BIOS checksum. If either <Ctrl> <Home> was pressed or the system BIOS checksum is bad, next will go to checkpoint code E0h. Otherwise, going to checkpoint code D7h.

B-2 Bootblock Recovery Codes

The bootblock recovery checkpoint codes are listed in order of execution:

Checkpoint	Code Description
E0h	The onboard floppy controller if available is initialized. Next, beginning the base 512 KB memory test.
E1h	Initializing the interrupt vector table next.
E2h	Initializing the DMA and Interrupt controllers next.
E6h	Enabling the floppy drive controller and Timer IRQs. Enabling internal cache memory.
Edh	Initializing the floppy drive.

Eeh	Looking for a floppy diskette in drive A:. Reading the first sector of the diskette.
Efh	A read error occurred while reading the floppy drive in drive A:.
F0h	Next, searching for the AMIBOOT.ROM file in the root directory.
F1h	The AMIBOOT.ROM file is not in the root directory.
F2h	Next, reading and analyzing the floppy diskette FAT to find the clusters occupied by the AMIBOOT.ROM file.
F3h	Next, reading the AMIBOOT.ROM file, cluster by cluster.
F4h	The AMIBOOT.ROM file is not the correct size.
F5h	Next, disabling internal cache memory.
FBh	Next, detecting the type of flash ROM.
FCh	Next, erasing the flash ROM.
FDh	Next, programming the flash ROM.
FFh	Flash ROM programming was successful. Next, restarting the system BIOS.

B-3 Uncompressed Initialization Codes

The following runtime checkpoint codes are listed in order of execution. These codes are uncompressed in F0000h shadow RAM.

Checkpoint	Code Description
03h	The NMI is disabled. Next, checking for a soft reset or a power on condition.
05h	The BIOS stack has been built. Next, disabling cache memory.
06h	Uncompressing the POST code next.
07h	Next, initializing the CPU and the CPU data area.
08h	The CMOS checksum calculation is done next.
0Ah	The CMOS checksum calculation is done. Initializing the CMOS status register for date and time next.
0Bh	The CMOS status register is initialized. Next, performing any required initialization before the keyboard BAT command is issued.
0Ch	The keyboard controller input buffer is free. Next, issuing the BAT command to the keyboard controller.
0Eh	The keyboard controller BAT command result has been verified. Next, performing any necessary initialization after the keyboard controller BAT command test.
0Fh	The initialization after the keyboard controller BAT command test is done. The keyboard command byte is written next.
10h	The keyboard controller command byte is written. Next, issuing the Pin 23 and 24 blocking and unblocking command.

Checkpoint	Code Description
11h	Next, checking if <End or <Ins> keys were pressed during power on. Initializing CMOS RAM if the *Initialize CMOS RAM in every boot* AMIBIOS POST option was set in AMIBCP or the <End> key was pressed.
12h	Next, disabling DMA controllers 1 and 2 and interrupt controllers 1 and 2.
13h	The video display has been disabled. Port B has been initialized. Next, initializing the chipset.
14h	The 8254 timer test will begin next.
19h	The 8254 timer test is over. Starting the memory refresh test next.
1Ah	The memory refresh line is toggling. Checking the 15 second on/off time next.
2Bh	Passing control to the video ROM to perform any required configu ration before the video ROM test.
2Ch	All necessary processing before passing control to the video ROM is done. Looking for the video ROM next and passing control to it.
2Dh	The video ROM has returned control to BIOS POST. Performing any required processing after the video ROM had control.
23h	Reading the 8042 input port and disabling the MEGAKEY Green PC feature next. Making the BIOS code segment writable and performing any necessary configuration before initializing the interrupt vectors.
24h	The configuration required before interrupt vector initialization has completed. Interrupt vector initialization is about to begin.
25h	Interrupt vector initialization is done. Clearing the password if the POST DIAG switch is on.
27h	Any initialization before setting video mode will be done next.
28h	Initialization before setting the video mode is complete. Configuring the monochrome mode and color mode settings next.
2Ah	Bus initialization system, static, output devices will be done next, if present. See the last page for additional information.
2Eh	Completed post-video ROM test processing. If the EGA/VGA controller is not found, performing the display memory read/write test next.
2Fh	The EGA/VGA controller was not found. The display memory read/ write test is about to begin.
30h	The display memory read/write test passed. Look for retrace checking next.
31h	The display memory read/write test or retrace checking failed. Performing the alternate display memory read/write test next.
32h	The alternate display memory read/write test passed. Looking for alternate display retrace checking next.

Checkpoint Code	Description
34h	Video display checking is over. Setting the display mode next.
37h	The display mode is set. Displaying the power on message next.
38h	Initializing the bus input, IPL, general devices next, if present. See the last page of this chapter for additional information.
39h	Displaying bus initialization error messages. See the last page of this chapter for additional information.
3Ah	The new cursor position has been read and saved. Displaying the *Hit <DEL>* message next.
3Bh	The *Hit <DEL>* message is displayed. The protected mode memory test is about to start.
40h	Preparing the descriptor tables next.
42h	The descriptor tables are prepared. Entering protected mode for the memory test next.
43h	Entered protected mode. Enabling interrupts for diagnostics mode next.
44h	Interrupts enabled if the diagnostics switch is on. Initializing data to check memory wraparound at 0:0 next.
45h	Data initialized. Checking for memory wraparound at 0:0 and finding the total system memory size next.
46h	The memory wraparound test is done. Memory size calculation has been done. Writing patterns to test memory next.
47h	The memory pattern has been written to extended memory. Writing patterns to the base 640 KB memory next.
48h	Patterns written in base memory. Determining the amount of memory below 1 MB next.
49h	The amount of memory below 1 MB has been found and verified. Determining the amount of memory above 1 MB memory next. for a soft reset and clearing the memory below 1 MB for the soft reset next. If this is a power on situation, going to checkpoint 4Eh next.
4Ch	The memory below 1 MB has been cleared via a soft reset. Clearing the memory above 1 MB next.
4Dh	The memory above 1 MB has been cleared via a soft reset. Saving the memory size next. Going to checkpoint 52h next.
4Eh	The memory test started, but not as the result of a soft reset. Displaying the first 64 KB memory size next.
4Fh	The memory size display has started. The display is updated during the memory test. Performing the sequential and random memory test next.
50h	The memory below 1 MB has been tested and initialized. Adjusting the displayed memory size for relocation and shadowing next.

Checkpoint	Code Description
51h	The memory size display was adjusted for relocation and shadow ing. Testing the memory above 1 MB next.
52h	The memory above 1 MB has been tested and initialized. Saving the memory size information next.
53h	The memory size information and the CPU registers are saved. Entering real mode next.
54h	Shutdown was successful. The CPU is in real mode. Disabling the Gate A20 line, parity, and the NMI next.
57h	The A20 address line, parity, and the NMI are disabled. Adjusting the memory size depending on relocation and shadowing next.
58h	The memory size was adjusted for relocation and shadowing. Clearing the *Hit <DEL>* message next.
59h	The *Hit <DEL>* message is cleared. The *<WAIT...>* message is displayed. Starting the DMA and interrupt controller test next.
60h	The DMA page register test passed. Performing the DMA Controller 1 base register test next.
62h	The DMA controller 1 base register test passed. Performing the DMA controller 2 base register test next.
65h	The DMA controller 2 base register test passed. Programming DMA controllers 1 and 2 next.
66h	Completed programming DMA controllers 1 and 2. Initializing the 8259 interrupt controller next.
67h	Completed 8259 interrupt controller initialization.
7Fh	Extended NMI source enabling is in progress.
80h	The keyboard test has started. Clearing the output buffer and checking for stuck keys. Issuing the keyboard reset command next.
81h	A keyboard reset error or stuck key was found. Issuing the keyboard controller interface test command next.
82h	The keyboard controller interface test completed. Writing the com mand byte and initializing the circular buffer next.
83h	The command byte was written and global data initialization has completed. Checking for a locked key next.
84h	Locked key checking is over. Checking for a memory size mismatch with CMOS RAM data next.
85h	The memory size check is done. Displaying a soft error and checking for a password or bypassing WINBIOS Setup next.
86h	The password was checked. Performing any required programming before WINBIOS Setup next.

Checkpoint	Code Description
87h	The programming before WINBIOS Setup has completed. Uncompressing the WINBIOS Setup code and executing the AMIBIOS Setup or WINBIOS Setup utility next.
88h	Returned from WINBIOS Setup and cleared the screen. Performing any necessary programming after WINBIOS Setup next.
89h	The programming after WINBIOS Setup has completed. Displaying the power on screen message next.
8Bh	The first screen message has been displayed. The <*WAIT...*> message is displayed. Performing the PS/2 mouse check and extended BIOS data area allocation check next.
8Ch	Programming the WINBIOS Setup options next.
8Dh	The WINBIOS Setup options are programmed. Resetting the hard disk controller next.
8Fh	The hard disk controller has been reset. Configuring the floppy drive controller next.
91h	The floppy drive controller has been configured. Configuring the hard disk drive controller next.
95h	Initializing the bus option ROMs from C800 next. See the last page of this chapter for additional information.
96h	Initializing before passing control to the adaptor ROM at C800.
97h	Initialization before the C800 adaptor ROM gains control has com pleted. The adaptor ROM check is next.
98h	The adaptor ROM had control and has now returned control to BIOS POST. Performing any required processing after the option ROM returned control.
99h	Any initialization required after the option ROM test has completed. Configuring the timer data area and printer base address next.
9Ah	Set the timer and printer base addresses. Setting the RS-232 base address next.
9Bh	Returned after setting the RS-232 base address. Performing any required initialization before the Coprocessor test next.
9Ch	Required initialization before the Coprocessor test is over. Initializing the Coprocessor next.
9Dh	Coprocessor initialized. Performing any required initialization after the Coprocessor test next.
9Eh	Initialization after the Coprocessor test is complete. Checking the extended keyboard, keyboard ID, and Num Lock key next. Issuing the keyboard ID command next.
A2h	Displaying any soft errors next.
A3h	The soft error display has completed. Setting the keyboard typematic rate next.

Checkpoint Code	Description
A4h	The keyboard typematic rate is set. Programming the memory wait states next.
A5h	Memory wait state programming is over. Clearing the screen and enabling parity and the NMI next.
A7h	NMI and parity enabled. Performing any initialization required before passing control to the adaptor ROM at E000 next.
A8h	Initialization before passing control to the adaptor ROM at E000h completed. Passing control to the adaptor ROM at E000h next.
A9h	Returned from adaptor ROM at E000h control. Performing any initialization required after the E000 option ROM had control next.
Aah	Initialization after E000 option ROM control has completed. Displaying the system configuration next.
Abh	Uncompressing the DMI data and executing DMI POST initialization next.
B0h	The system configuration is displayed.
B1h	Copying any code to specific areas.
00h	Code copying to specific areas is done. Passing control to INT 19h boot loader next.

B-4 Bus Checkpoint Codes

The system BIOS passes control to different buses at the following checkpoints:

Checkpoint	Code Description
2Ah	Initializing the different bus system, static, and output devices, if present.
38h	Initialized bus input, IPL, and general devices, if present.
39h	Displaying bus initialization error messages, if any.
95h	Initializing bus adaptor ROMs from C8000h through D8000h.

Additional Bus Checkpoints

While control is inside the different bus routines, additional checkpoints are output to I/O port address 0080h as word to identify the routines being executed. These are word checkpoints.

The low byte of checkpoint is the system BIOS checkpoint where control is passed to the different bus routines.

The high byte of checkpoint indicates that the routine is being executed in Different buses.

High Byte

The high byte of these checkpoints includes the following information:

Bits 7-4	Description
0000 Function 0.	Disable all devices on the bus.
0001 Function 1.	Initialize static devices on the bus.
0010 Function 2.	Initialize output devices on the bus.
0011 Function 3.	Initialize input devices on the bus.
0100 Function 4.	Initialize IPL devices on the bus.
0101 Function 5.	Initiate general devices on the bus.
0110 Function 6.	Initialize error reporting on the bus.
0111 Function 7.	Initialize add-on ROMs for all buses.

Bits 3-0	Specify the bus
0	Generic DIM Device Initialization Manager.
1	Onboard System devices.
2	ISA devices.
3	EISA devices.
4	ISA PnP devices.
5	PCI devices.

Appendix C
List of Figures

The following is a list of the figures in this manual and the page numbers they appear on.

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Notes

Appendix D
System Specifications

Processors
Up to two Intel 370-pin Pentium III 600 MHz-1.26+ GHz CPUs at a 133/ 100 MHz FSB

Memory Capacity
4 DIMM slots to support a maximum of 4 GB Registered SDRAM

DIMM Sizes
128 MB / 256 MB / 512 MB / 1 GB Registered SDRAM modules supported

SCSI Controller
Adaptec AIC-7899W for dual channel Ultra160 SCSI

SCSI Backplane Controller
QLogic GEM354 controller for SAF-TE compliant SCA backplane

SCSI Drive Bays
Four drive bays to house two (2) standard 1" 80-pin SCA SCSI drives

Peripheral Bays
One (1) 3.5" floppy drive and one (1) slim CD-ROM drive

PCI Expansion Slots
Two (2) 64-bit, 66 MHz and four (4) 64-bit, 33 MHz PCI slots

Power Supply
Type: 2 x 300W redundant, hot-plug units with +3.3V, +5V, +12V, -5V and -12V main DC outputs and a 5V standby output.
Input Voltage: 120V or 240VAC with PFC
Power Units are autoswitching capable
Fans: Each unit has one 80 mm ball bearing fan

Operating Environment

Operating Temperature Range: 10 to 35 degrees C
Humidity Range: 20-80%, non-condensing
Safety Regulations: CE, UL/CUL, EMC
EMI: FCC part 15, CISPR 22

Cooling Fans

System: Four (4) 9-cm, hot-plug ball bearing fans
Exhaust: One (1) 9-cm ball bearing fans
Onboard Fan Headers: Two CPU, three chassis and one overheat headers; max. current = .035 amps/ea. or 1.2 amps/set of four

Form Factor

P3TDE6 motherboard: Extended ATX
SC840 chassis: 4U rackmount

Operating Systems Supported

Windows NT, Windows 2000, Solaris, Netware, SCO UNIX and Linux

Dimensions

17.52 x 6.97 x 25.99 in.; 445 x 177 x 660 mm (W x H x D)

Weight

Net: 57.2 lb. (26 kg.)
Gross: 70.4 lb. (32 kg.)

Regulatory Compliance

Electromagnetic Emissions:
FCC Class B, EN 55022 Class B, EN 61000-3-2/-3-3, CISPR 22 Class B

Electromagnetic Immunity:
EN 55024/CISPR 24, (EN 61000-4-2, EN 61000-4-3, EN 61000-4-4, EN 61000-4-5, EN 61000-4-6, EN 61000-4-8, EN 61000-4-11)

Safety:
EN 60950/IEC 60950-Compliant
UL Listed (USA)
CUL Listed (Canada)
TUV Certified (Germany)
CE Marking (Europe)